INDIA RUBBER WORLD
FOUNDED 1889
CAOUTCHOUC GUTTA-PERCHA

Reg. United States Pat. Off. Reg. United Kingdom.

Published on the 1st of each month by

THE INDIA RUBBER PUBLISHING CO.
No. 25 West 45th Street, New York.
Telephone—Bryant 2576.
CABLE ADDRESS: IRWORLD, NEW YORK.

HENRY C. PEARSON, F.R.G.S., Editor

Vol. 63 DECEMBER 1, 1920 No. 3

SUBSCRIPTION: $3.00 per year, $1.75 for six months, postpaid, for the United States and dependencies and Mexico. To the Dominion of Canada and all other countries, $3.50 (or equivalent funds) per year, postpaid.

ADVERTISING: Rates will be made known on application.

REMITTANCES: Should always be made by bank draft. Post Office or Express money order on New York, payable to THE INDIA RUBBER PUBLISHING COMPANY. Remittances for foreign subscriptions should be sent by International Postal Order, payable as above.

DISCONTINUANCES: Yearly orders for subscriptions and advertising are regarded as permanent, and after the first twelve months they will be discontinued only at the request of the subscriber or advertiser. Bills are rendered promptly at the beginning of each period, and thereby our patrons have due notice of continuance.

AN INTERNATIONAL RUBBER ASSOCIATION

THE SUGGESTION is not new but suggestions of any sort rarely are new. That it comes now when almost everything in the line of reconstruction that can be put in effect is being tried or at least considered, is significant. The machinery for such an association lies in the great rubber manufacturing and planting associations that are already in existence here and abroad. The ease with which delegates could assemble at the next rubber exhibition and make a beginning is most evident. As a stabilizer, an educator and perhaps a money saver, it could be made exceedingly valuable. In one particular it might do a great good, and that is by stopping piracy of names, trade marks and patents.

Of course when one ponders the subject, it takes on qualities that suggest a League of Nations and the inevitable "14 points" obtrude themselves. Nevertheless, Article X might be omitted and serenity assured. The association might be a great help to the trade. Its rulings and laws would possess only a moral force. It would be a minor Hague tribunal without teeth, but with wise men at its head and a policy of fair dealing, together with statistical and newspaper sense, much good could be accomplished.

WHEN RUBBER GROWS OLD

A REMARK often heard among the uninformed is that the general average of quality in rubber goods is lower than formerly. Mr. Average Buyer, who is often unwilling to buy high-grade rubber goods, generally gets a second rate, poorly compounded article, takes no care of it, when he does not actually abuse it, and when it gives out sooner than he expected, scores the whole industry with the remark that "they are not making rubber goods as good as they used to." Mr. A. B. forgets the fact that rubber, like human beings, grows old. It has its stages of infancy, middle age, and decrepitude. Soft, pliant, elastic in youth, its tissue in old age takes on a change not unlike that of the arteries in senility, becoming hard, stiff and brittle. Negligent owners of automobiles are surprised at the appearance of minute fissures in the side walls of their tires and the manufacturers are scored for the supposed defect, when it is usually a fact that the tire owners have failed to conserve the strength of the tires with proper inflation and to guard against excessive light, heat, abrasion, etc.; and the tire grows old, like many humans, long before its time. Users of many other rubber articles often leave them lying about carelessly or exposed to strong alkaline or other harmful solutions, and then wonder why rubber goods deteriorate and become irreparable. Even the most expert retreader cannot galvanize new life into a tire that has not been given reasonable care and moderate exercise to keep it "fit."

ARE WE OVERINDUSTRIALIZED?

WITH the urban share of the population, once but a third, but now approaching two-thirds of the total, the query put by former Secretary of the Interior Lane, "Are we becoming overindustrialized?" has given many cause for serious reflection, and in most instances the essayists are disposed to answer the question in the affirmative. Even conceding that industrialism, i. e., manufacturing, is keeping well in advance of agriculture, there is no occasion yet for any anxiety. While the small farmers have become relatively fewer, the number of great stock-raising and agricultural concerns has increased and with modern methods and machinery, improved roads, motor trucks, etc., the output of the farms is larger than ever.

In a measure offsetting the tendency toward overindustrialism some far-sighted manufacturers, rubber mill owners being foremost among them, have made extensive plans for providing semi-rural homes with small truck gardens for their employes, and the workers show their appreciation of such interest in their welfare outside the mills. It is all in harmony with the modern idea of har-

monizing industry, and if such work be extended by other manufacturers, we will soon have less labor unrest and healthier, happier, and more efficient workers.

COLLECTIVE RESPONSIBILITY

IN the opinion of the unpractical sentimentalist, the steel strike, which collapsed a few months ago, was waged wholly in the cause of hours, wages and the control of jobs. To the experienced industrial manager it was simply one of a series of disturbances deliberately planned to wrest the control of industry from its owners and to place it under the domination of the most radical element of organized labor.

This is the view of Charles Piez, president of the Link-Belt Company, of Chicago, who has had exceptional opportunity to study situations of this kind. In a current magazine article he declares that the real purpose of the strike was best reflected in the character of the two men who assumed leadership. One was an avowed syndicalist who continually denounced the wage system as "a brazen, gigantic robbery"; and the other was an adroit labor politician, without knowledge of the problems of industry, and who fought all workmen's compensation legislation and the fairest measures of compromise.

Mr. Piez scores one big point with which all fair-minded people are in accord, and that is, if labor insists upon collective bargaining it must also be made to realize that the people will just as strictly insist upon collective responsibility on the part of labor.

HIGH WAGE PROPAGANDA

APPREHENSIVE of a possible revision in the present high wage scale in the mills making cotton and other fabrics, leaders among the United Textile Workers of America have been urging the establishment of a million-dollar fund for combating any attempt to lower wages in the textile industry in the United States and Canada. It is not stated just how such a "war chest" would be disbursed, but a fair inference would seem to be that it would be used largely to promote and maintain strikes. The leaders do not seem to worry over the fact that, although they personally may be spared hardship, tens of thousands of operatives and their dependents may suffer severely if a strike be called. Employers cannot do the impossible. In the face of an insistent public demand for lower prices and often keen competition they cannot guarantee that the war-time wage scale will be maintained, much less promise a considerable and immediate reduction in working time.

In the event of labor assuming an unreasonable attitude, the mill owners might adopt the one recourse left to them, to close down until the strikers on sober, second thought came to realize that there are two sides to the employment question, and that no manufacturer can operate a mill under intolerable and unprofitable conditions. If great factories are to be idle for a long period, no million dollar defense fund would adequately reimburse the workers for their loss, much less compensate a big community disorganized by such industrial paralysis.

THE BRITISH RUBBER INDUSTRY

THE WISDOM of raising an ample amount of raw material within a nation's boundaries or possessions and maintaining even an overabundant reserve as a precaution against possibly adverse conditions is strikingly illustrated in an article by B. D. Porritt in the British *Journal of the Society of Chemical Industries,* on "The Rubber Industry and the War."

He shows that out of the world's supply of 120,000 tons of crude rubber in 1914, 71,000 tons were produced within the empire, although the annual consumption then by British rubber manufacturers was but 18,000 tons. So, too, he states that even though the British manufacturers were put at a great disadvantage during the war by being obliged to use their factories almost entirely for making military and naval supplies, they readily shared their stock of raw rubber with American competitors who enjoyed considerable and profitable commerce at home and with Allied and neutral countries. Peculiarly interesting is the author's recital of the novel, numerous, and ingenious uses to which British manufacturers applied rubber for war needs, how they overcame the shortage in chemical supplies, and how the industry gave itself wholeheartedly to the Allied cause and proved a powerful factor in winning the war.

Touching upon "The Position and Prospects of the Rubber Industry" in Great Britain, in the same journal, W. A. Williams takes a very optimistic view. While conceding some actual and possible drawbacks to which the industry is or may be subjected, such as the higher cost of labor, the insufficient rail transportation, the none too plentiful supplies of chemicals, the restricted cultivation of Egyptian cotton, and the rising tide of tire production in the United States, for protection against which government aid may be sought, the writer is confident that the British rubber industry will nevertheless hold its own. Favorable factors are: great supplies of raw material, radically improved methods in quantity and quality output, and constant modernization of plants.

AN APT PHRASE OFTEN DOES MORE TO IMPRESS THAN reams of argument and exposition. "Growing pains" was what J. Newton Gunn termed the spasms of fear induced by the recent slackening in the tire business. Not only apt but prophetically true.

CALIFORNIA EXPERTS AFTER EXHAUSTIVE TESTS GIVE rubber jar rings a clean bill of health as regards poison olives. The poison did not come from the rubber but was due to faulty treatment of the fruit before canning.

Cost Accounting in the Rubber Industry

By Ferd G. Kirby[1]

COST ACCOUNTING for the rubber industry can very easily be allowed to become so detailed that the cost of maintenance of the system becomes greater than its utility warrants. Inasmuch as the material, largely rubber, is a more or less variable quantity, and of necessity introduces the use of certain factors and prorations, in addition to the usual estimations encountered in cost finding, any method of accounting which endeavors to subdivide the various items too closely is of doubtful utility, owing to the fact that since many basic figures are themselves the result of estimate and proration, any method which carries its calculations and deductions to extremes is a fallacy.

Rubber manufacturers in general recognize the vital importance of a knowledge of the cost of their product, yet but few of them have a cost system on which they are willing to rely under all conditions.

While it is possible to get quite accurately the amount of material and labor used directly in the production of an article, and several systems have been devised which accomplish this result, there does not seem to be in general use any system of distributing that portion of the expense known variously as indirect expense, burden, or overhead, in such a manner as to make sure that it has been done properly. There are in common use several methods of distributing this expense. One is to distribute to the product the total indirect expense including interest, taxes, insurance, etc., according to the direct labor. Another is to distribute a portion of this expense according to direct labor, and a portion to machine hours. Other methods distribute a certain amount of this expense on the materials used, etc. Most of these methods contemplate the distribution of all of the indirect expense of the manufacturing plant, however much it may be, on the output produced, no matter how small it is.

If the factory is running at its full, or normal capacity, this item of indirect expense per unit of product is usually small. If the factory is running at only a fraction of its capacity, say one-half, and turning out only one-half of its normal product, there is but little change in the total amount of this indirect expense, all of which must now be distributed over half as much product as previously, each unit of product thereby being obliged to bear approximately twice as much expense as previously.

When times are good, and there is plenty of business, this method of accounting indicates that the costs are low; but when times become bad and business is slack, it indicates high costs due to increased proportion of burden each unit has to bear. During good times, when there is a demand for all the product that can be made, it is usually sold at a high price and the element of cost is not such an important factor. When business is dull, however, manufacturers cannot get such a high price

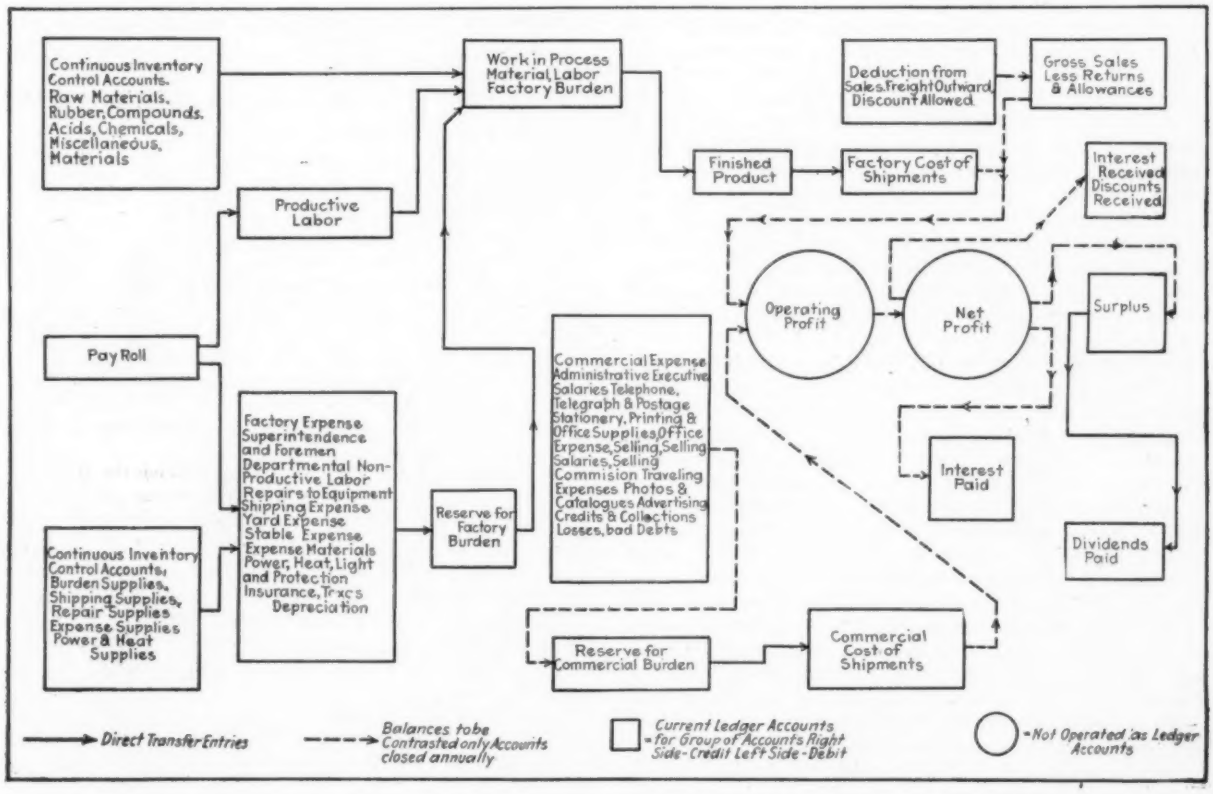


FIG. 1. ORGANIZATION AND RELATION OF ACCOUNTS IN GENERAL PLAN OF COST CONTROL IN THE RUBBER INDUSTRY

[1] Accountant, R. T. Lyman & Co., Inc.

for their products, and the question of at how low a price can they afford to sell the product is of vital importance. Rubber manufacturing cost systems, as generally operated at present, show under such conditions that costs are high and, if business is very bad, they usually show a cost far greater than the amount obtained for the goods. In other words, the present systems of cost accounting go to pieces when they are most needed. This being the case, many have felt for a long time that there was something radically wrong with the present theories on the subject.

As an illustration, the writer will cite a case which recently came to his attention. A manufacturer found that his cost on a certain article was forty cents. When he found he could buy it for thirty-four cents, he stopped manufacturing and bought it, saying that he did not understand how his competitor could sell at such a low price. He seemed to realize that there was a flaw somewhere but he could not locate it. When he was asked of what his expense consisted, his reply was: labor fifteen cents, material nine cents, and overhead sixteen cents. He was then asked if he was running his factory at full capacity, and the writer was informed that he was running it at less than half its capacity, possibly a little over one-third. The next question was: What would be the overhead on this article if the factory were running full? The reply was that it would be about eight cents. The writer suggested then in such a case the cost would be only thirty-two cents. The possibility that his competitor was running his factory full suggested itself at once as an explanation.

The next question that suggested itself was how the sixteen cents overhead, which was charged to this article, would be paid if the article was bought. The obvious answer was that it would have to be distributed over the product still being made and would thereby increase its cost. In such a case it would probably be found that some other article was costing more than it could be bought for; and if the same policy was pursued, the second article should be bought, which would cause the remaining product to bear a still higher expense rate. If this policy were carried to its logical conclusion, the manufacturer would be buying everything before long, and be obliged to give up manufacturing entirely.

The illustration which is cited above is not an isolated case but is representative of the problems before a large class of rubber manufacturers, who believe that all the expense, however large, must be carried by the output produced, however small. This theory of expense distribution indicates a policy which in dull times would, if followed logically, put many manufacturers out of business. In fact the writer knows of a plant which was recently put out of business by just this kind of logic.

Fortunately for the country, the American people as a whole will finally discard theories which conflict with common sense; and, when their cost figures indicate an absurd conclusion, most of them will repudiate the figures. A cost system, however, which fails when needed most, is of but very little value and it is imperative to devise a theory of costs that will not fail.

Most of the cost systems in use, and the theories on which they are based, have been devised by accountants for the benefit of financiers, whose aim has been to criticize the factory and to make it responsible for all shortcomings of the business. In this the financiers have succeeded admirably, largely because the methods used are not so devised as to enable the agent or superintendent to present his side of the case.

One of the prime functions of cost-keeping is to enable the agent or superintendent to know whether or not he is doing the work he is responsible for as economically as possible, a function which is ignored in the majority of cost systems now in general use. Many accountants who make an attempt to show it, are so long in getting their figures in shape that they are practically worthless for the purpose intended, the possibility of using them having passed.

THE GENERAL PLAN

The general plan of cost accounting for a rubber plant followed by the writer is illustrated by Fig. 1. In applying costs for the rubber industry, the plan outlined is covered by the following formula, which includes and illustrates the successive stages of cost accumulation from gross sales to final net profit.

Gross sales, less returns and allowances		G.S.
Less:		
Freight—outward	F	
Commissions	C	
Discounts	D	
Total deductions from sales		T.D.
Net sales		N.S.
Less:		
Factory cost of shipments		
Materials consumed	M	
Direct labor employed	L	
Factory burden or indirect cost	B	
Total factory cost of shipments		F.C.
Gross manufacturing profit		G.P.
Less:		
Commercial cost of shipments		
Administrative expense	A	
Selling expense	S	
Total commercial cost of shipments		C.C.
Operating profit		O.P.
Other income:		
Interest and discount received		I.R.
Total		S.P.
Other charges:		
Interest expense		I.E.
Net profit		N.P.

Some accountants and executives, will, of course, differ regarding this method of handling interest, but in connection with the rubber industry the writer's experience has demonstrated that this method is the more feasible. The plan outlined above embraces the establishment of continuous inventory control accounts for raw materials and burden supplies. Records of raw materials and supplies consumed each month are obtained and the value transferred to an account which represents the value of work in process. The productive labor employed each month is analyzed and also transferred to the account representing the value of the work in process.

Various accounts are maintained representing the factory burden or indirect cost of operation. The relation of the costs of factory burden and the cost of productive labor is determined and ratios of burden expense developed. Each month, in proportion to the productive labor employed, a charge is made to the account representing value of work in process for the proportionate share of burden applicable to work in process. The amounts so applied are credited to a reserve account, the object of which is to indicate how closely the charges to work in process for factory burden, compare with the actual cost of factory burden as shown by the aggregate of balances in the various factory expense accounts.

Records of product finished are obtained which are calculated at cost values, the aggregate being credited to the account representing the value of work in process and charged to an account representing the value of the finished product. At this particular point in the plan of accounting, the plan must be varied according to the individual needs of a manufacturer. In some cases, instead of one account representing the value of work in process, several accounts will be necessary, representing the value of work in process at successive stages of manufacture.

Having accumulated the cost of all goods entering into the finished product account, the cost of all shipments is calculated and the aggregate is credited to the account representing the value of finished product and charged to the account representing factory cost of shipment.

Various accounts are maintained representing the details of administrative and selling expenses, and in order to be assured that the ratios of administrative and selling expenses to the total factory cost are correctly employed in cost calculations there is provided an account representing the commercial cost of shipments, to which is charged an amount representing the estimated value of administrative and selling expenses based upon the factory cost of goods shipped. The amounts so charged to the commercial cost of shipments are credited to a reserve for a commercial burden. The balances in the latter account represent the aggregate of amounts applied to the commercial cost of shipments for commercial burden, and should be in substantial agreement with the accounts representing the details of administrative and selling expenses.

Separate accounts are maintained representing the cost of freight outward, commission and discounts allowed, which are considered as deductions from gross sales. All returns and allowances are charged against gross sales.

To determine the operating profit, therefore, in the manner indicated in the formula outlined in the foregoing, the amount of sales after the deductions have been made will be contrasted with the factory cost of shipments, plus the commercial cost of shipments, with the object of showing the operating profit.

Interest transactions will be considered after the determination of the operating profit and will be considered as direct additions thereto, or deductions therefrom, to arrive at the net profit. The transactions briefly described in the foregoing are to be recorded by months, with the very important object of obtaining a statement of monthly earnings.

ESTABLISHING BURDEN RATES

One of the first steps in establishing costs is to work out the ratio of burden to the direct labor charges for the various departments of the business. This is to provide the mechanism for making a charge each month to the account representing work in process, to cover the burden applicable to the cost of the product, in proportion to the amount of direct labor incurred during the month. It is preferable to make these charges at percentage rates according to the individual departments; that is, the ratio which the expense in a department bears to productive labor in that department is determined; and for all productive labor charged to work in process there is a further charge made to that account, based upon the departmental percentage rate, to cover the burden applicable to the cost of the product. These amounts are credited to the reserve for factory burden account, which represents at all times the accumulation of amounts applied to the costs to cover the burden charges. The principal advantages of the use of departmental expense rates in the calculation of burden charges are as follows:

(a) Closer values may be obtained for determining the selling price of partly finished product.

(b) Closer values may be obtained for use in pricing the inventory, which would, of necessity, be found in all stages of process.

The aggregate of the general accounts representing the burden of indirect costs of manufacture will be in substantial agreement with the aggregate amounts of burden applied to the cost of production, as shown by the balance in the reserve account, if the production be upon a normal basis and the ratios of burden costs correctly compiled. Should the aggregate of the balances in the expense accounts be greater than the aggregate of burden applied, it would indicate that an increase should be made in the ratios used in applying the burden; but, on the other hand, should the aggregate of the balances in the expense accounts be less than the aggregate of burden applied, a decrease should be made in the expense rates. Should such variations occur as the result of abnormal operating conditions it is recommended that no radical changes in the expense rates be made, but rather that the variations should be considered as a separate charge to the operating profits of the year. It is inadvisable, for comparative purposes, to absorb in individual costs extraordinary expenses due to abnormal conditions.

The method of working up the percentages of burden in relation to direct labor varies with local conditions and at individual plants. Certain items, such as supervision, are distributed over the various departments in ratio to the direct labor itself, while others, such as heat and light, are apportioned according to floor area. The local conditions must be carefully examined to determine the proper basis for each case.

INTERLOCKING FACTORY COSTS INTO FINANCIAL ACCOUNTING

An essential feature of any cost plan is to absorb and check the actual accumulated cost figures by financial accounting that the total of all individual cost figures will be reflected and proved into monthly balance sheets. This is provided for by the establishment of a private ledger and a works ledger which must balance each other through controlling accounts. The accumulated cost figures are absorbed by the works ledger and the accumulated financial figures by the private ledger, thus assuring that each balances the other and that all transactions are absorbed by the one or the other.

ESTABLISHMENT OF PRIVATE AND WORKS LEDGER

To establish the cost plan correctly and the proof of the works ledger it is necessary to provide two controlling accounts which will represent the total investment in the form of raw materials, parts and product in process, finished product and factory expenses.

One of these accounts is carried upon the private ledger and is known as the works ledger controlling account symbol B. The other controlling account is known as the private ledger controlling account and is carried upon the works ledger, having the same symbol B. These two accounts act as controlling accounts to each other, and at the end of each month their balances should be in agreement.

At the beginning of the year the works ledger controlling account, symbol B, in the private ledger is charged with the total amount of the inventory. Through the year this account is charged with the total cost of all purchases of material, payroll and factory expenses. It is credited with the cost of all goods shipped and charged with the cost of any goods returned. The balance of this account will, therefore, at all times represent the total of raw material, work in process and finished stock inventories.

The foregoing describes in general the methods to be used in order to establish the accounts necessary for a monthly loss and gain statement supported by cost records as carried in the works ledger and controlled by the general books. The control of costs is thus obtained through proof of the balance in the various accounts in the works ledger in the following manner:

(a) When the balance of the various inventory accounts agrees with the physical inventory accounts, a proof is furnished that the value of materials consumed is substantially in agreement with the cost of the material.

(b) When the aggregate of the various factory overhead expense accounts, as a total, is in substantial agreement with the credits written off to the work in process burden, a proof is established that a proper percentage of burden expense has been used.

Considering the foregoing, it should be held in mind that the works ledger will give proof of the accuracy of the cost records and through these the loss and gain statement. Should there arise any question as to the amounts shown in the cost records, an analysis may be quickly made and traced through either the material, labor or expense accounts. The entire plan is subjected to direct proof when physical inventories are taken at different periods of the year.

(To be continued)

The Rubber Surplus and Its Relation to Future Tire Production

By Richard Hoadley Tingley

IN ARRIVING at the world's position with respect to crude rubber —and more particularly with respect to the United States, there are many factors to be taken into account. As every rubber man knows, there is a large surplus stock in the world's market, a very large portion of which is in this country. The exact amount of the surplus and where held is a matter about which there is no very definite knowledge. Each American importer and manufacturer seems to take the ground that the amount of his own personal holdings is a private matter to be kept as one of his trade secrets. Although almost anyone of them is willing to hazard a guess at the total surplus—world and United States, none will go much farther and the true amount is shrouded in more or less mystery.

On October 25, 1920, the *Trade News Service* of New York published a statement bearing on this matter which is reproduced as follows:

"In connection with views recently published as to the production and consumption of crude rubber a number of opinions have been given by factors in the New York market. While these are for the most part of a bearish nature, there are but few conflicting opinions since most of the statements are based on imports and consumption for a known period, namely, the past nine months of this year.

"According to the statements of dealers there were 65,000 tons of rubber in store in the United States on January 1, 1920, and arrivals for the nine months ended September 30, 1920, amounted to 192,000 tons, bringing into this market for the entire period a total of 257,000 tons of crude rubber.

"Consumption for the same period amounted to 165,000 tons, estimating 15,000 tons for January up to 30,000 tons for May when manufacturing was at its peak, and receding from that time.

"If this estimate is to be accepted, a surplus would be shown as of October 1, 1920, of 92,000 tons, and on the present limited scale of manufacture, even with decreaased imports, there would be an accumulation of rubber in this country at the end of the present year in excess of 100,000 tons.

"These figures represent not only stocks held in warehouses but also those in the hands of manufacturers. It is estimated that 30,000 tons are actually on spot at the present time in New York, but of this amount considerable has already been sold and it is difficult to estimate the amount actually available.

"In arriving at the world's present supply the American trade adds to the above amounts those quoted by the Rubber Growers' Association of London, August 31, 1920, of 33,000 tons held in London, which is expected to reach 50,000 tons by the end of the year. This, with the surplus stocks held in Singapore, Colombo, Java, and in the Brazilian markets, gives a total world's surplus of upwards of 200,000 tons."

It is the purpose of this article to analyze this statement and to ascertain how nearly it is correct; to see where, how, and when this surplus was rolled up, and to forecast, as well as maybe, under what conditions and how long a time it ought to take for the market to absorb it—for it is perfectly evident that, until it has been in a measure used up, the rubber market will continue to be in a more or less unsettled and dangerous condition.

In 1917, J. S. M. Rennie, as quoted in *London Times Trade Supplement*, foresaw an overproduction of rubber when he said:

"If some definite, strong action be not taken on behalf of this industry, and native Asiatic residents, plantation companies, and the powerful well-controlled American and British rubber goods manufacturers are allowed to continue planting ad lib., it is not difficult to foresee disastrous results to the industry, and the ultimate result may easily be that in, say, ten years' time, we may find ourselves with a planted area of 4,200,000 acres which, at 375 pounds per acre per annum, would give a total crop of 700,000 tons, and if the effective consumption at that time is less than that quantity by so much as a hair-breadth, so to speak, the selling price must logically fall to the approximate cost of production."

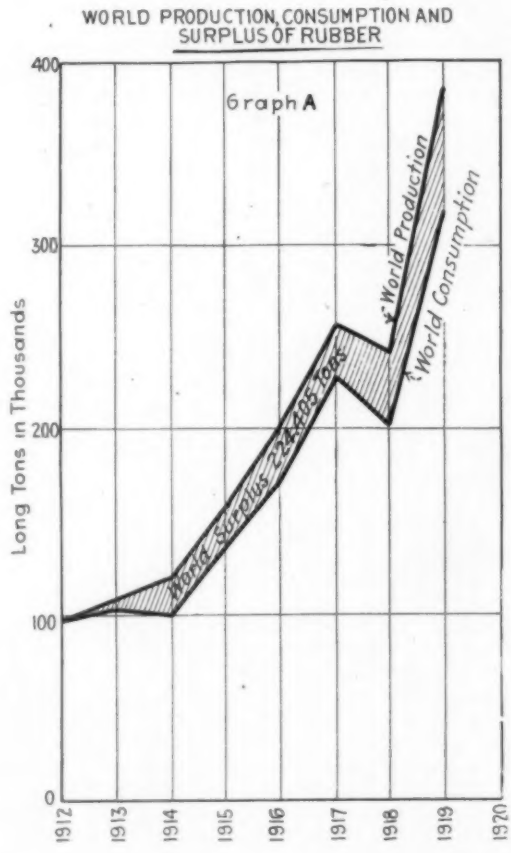
What Mr. Rennie foresaw in 1917 as a possibility in ten years from that time became an actuality, so far as price is concerned,

TABLE I

WORLD PRODUCTION, CONSUMPTION AND SURPLUS OF RUBBER
(In long tons)
(Reference to Graph A)

	Production (a)	Consumption (b)	Surplus
1912	98,928	95,863	3,035
1913	108,440	102,455	5,985
1914	120,380	99,800	20,580
1915	158,702	135,214	23,588
1916	201,598	169,474	32,124
1917	265,698	229,017	26,681
1918	241,579	201,620	39,959
1919	381,860	219,497	62,453
Accumulated surplus			224,405

(a and b) Production figures for 1912-1917, inclusive, are taken from "The Rubber Industry," prepared by the War Service Committee of the Rubber Industry of the United States. Amounts quoted for 1918 and 1919 are from THE INDIA RUBBER WORLD.



within a year—accentuated each year that has followed, with prices dangerously near the cost of production; indeed, the surplus was, at that very time, being accumulated, as will be seen by reference to Table I and Graph A herewith, of the world production, consumption and surplus of rubber from 1912 to 1919, inclusive.

The preceding table and graph clearly show that the educated "estimate" or "guess" of manufacturers and dealers is substantiated, at least, so far as the world's position is concerned. If the figures quoted are correct—and they come from the best of authority—each year, from 1912 to and including 1919, has produced more rubber than that particular year has consumed, the surplus or "carry-over" from year to year accumulated at the end of 1919 being apparently 224,405 tons.

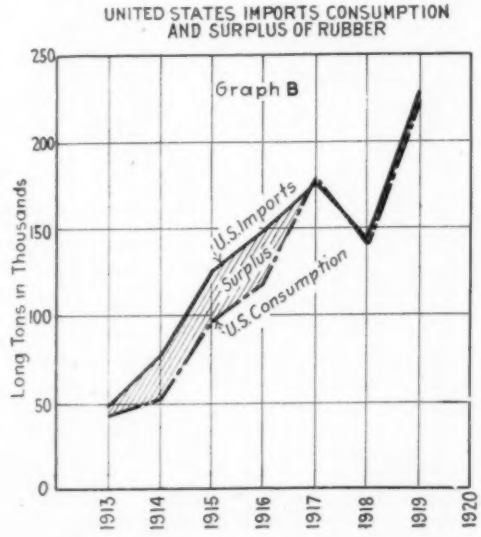
Applying a similar analysis upon the importations to, and the consumption of rubber in the United States, further confirmation is had of the "views" and "estimates" made by dealers and manufacturers, as will be seen by reference to Table II and Graph B. Here it will be seen that a surplus has been gradually accumulating, year by year, since 1912, and that it amounted to 83,350 tons at the end of 1919.

TABLE II

UNITED STATES IMPORTS, CONSUMPTION, AND SURPLUS STOCKS OF RUBBER
(In long tons)
(Reference to Graph B)

	Imports (a)	Consumption (b)	Surplus	Deficit
1913	58,927	52,179	6,748	.....
1914	76,817	61,251	15,566	.....
1915	123,560	96,792	26,768	.....
1916	148,827	116,477	32,360	.....
1917	173,928	177,088	.....	3,160
1918	145,517	142,722	2,795	.....
1919	239,260	236,977	2,283	.....
Totals			86,510	3,160
Accumulated surplus			83,350	.....

(a) United States imports are taken from THE INDIA RUBBER WORLD, November 1, 1920, page 144.
(b) United States consumption: from "The Rubber Industry," prepared by the War Service Committee of the Rubber Industry of the United States.



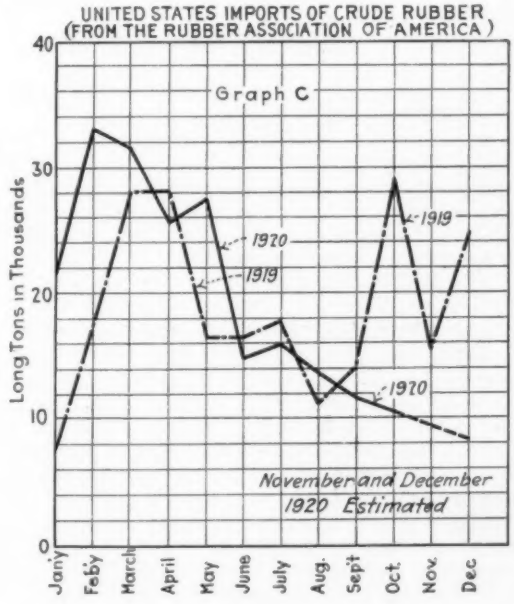
Further analyzing the position of the United States with respect to the present year, 1920, it will be seen from Table III, and Graph C that imports of rubber in 1920, although in total amount falling but slightly below 1919 quantities, have, since September, declined greatly from the amounts imported in the latter part of 1919. In October, 1919, these imports totaled 28,888 tons, dropping to 10,693 tons in the same month of 1920, the lowest record for any single month for the past two years. The amounts given for November and December, 1920, are estimated by taking the best consensus of opinion of the trade.

TABLE III

UNITED STATES IMPORTS OF CRUDE RUBBER
(From The Rubber Association of America)
(In long tons)
(Reference to Graph C)

	1920	1919
January	21,351	7,235
February	32,994	17,456
March	31,650	28,223
April	23,675	28,146
May	27,338	16,348
June	14,881	16,319
July	15,884	17,965
August	13,564	11,067
September	11,636	14,036
October	10,639	28,888
November	9,600[a]	15,674
December	8,400[a]	24,675
Totals	221,612	226,032

[a]Estimated.



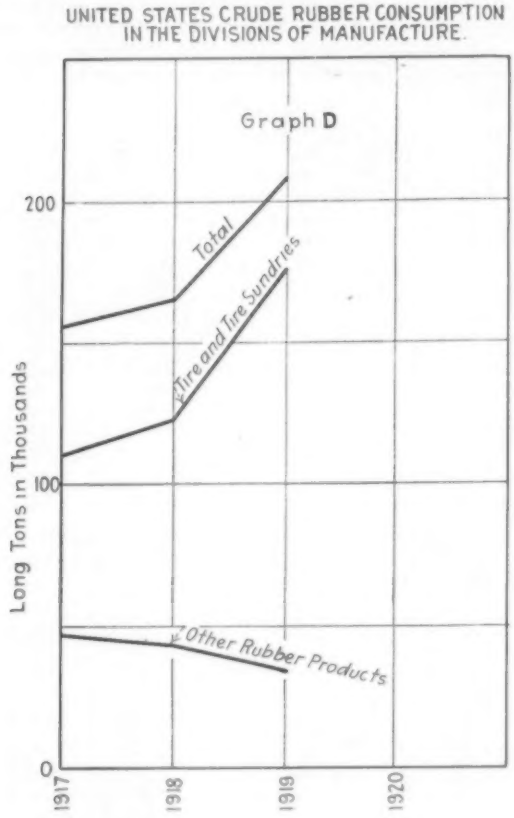
The Rubber Association of America, through a series of questionnaires addressed to rubber manufacturers, made an endeavor to ascertain the amounts of crude rubber used in the years 1917, 1918 and 1919 in the various departments of manufacture. Its

TABLE IV

UNITED STATES CRUDE RUBBER CONSUMPTION IN THE DIVISIONS OF MANUFACTURE
(In millions of pounds; 000's omitted)
(In thousands of long tons; 000's omitted)
(Reference to Graph D)

	1917		1918		1919	
	Pounds	Tons	Pounds	Tons	Pounds	Tons
Tire and tire sundries	247,021	110	272,607	121	389,104	174
Other rubber products	105,654	47	98,405	44	77,830	35
Totals	352,675	157	371,012	165	466,934	209

Note: The above figures for 1917 are taken from reports compiled by the United States Government during the war. See THE INDIA RUBBER WORLD, May 1, 1918. These are taken as correct. Since, however, the reports issued by The Rubber Association of America of a limited number of replies to their questionnaire for similar data covering the same period indicate but 87 per cent of the government totals, the returns of the association for the yerrs 1918 and 1919, also covering a limited number of replies to their questionnaire, have been taken as 87 per cent correct, and the figures in the above table adjusted accordingly.



questionnaire divided the industry into two heads—"Tires and Tire Sundries" and "Other Rubber Products." Although nearly every rubber manufacturer was thus addressed, replies were received from by no means all and therefore the results did not disclose the entire story. In 1917, during the war, the United States Government made a very complete canvass of the situation, covering practically the same ground. At that time nearly every manufacturer replied to the questionnaire and the result shows that, assuming the United States figures to be correct, the amounts quoted by The Rubber Association as a result of its limited canvass are but 87 per cent of the truth. I assume for the purposes of estimation, also from the limited number of replies received by the association, that its figures for 1918 and 1919 are but 87 per cent of the total, and produce Table IV, and Graph D.

On June 24, 1920, Zorn and Leigh-Hunt of London made an analysis of the world's rubber position which they called "The Coming Rubber Shortage." In this they exhibit the following table of producing rubber acreages:

TABLE V

ACREAGES UNDER CULTIVATION

In bearing before 1915	900,000	....
Increase in 1915	280,000	31%
" 1916	420,000	35%
" 1917	340,000	21%
" 1918	220,000	11%
" 1919	170,000	8%
" 1920	120,000	5%
Total now in bearing	2,450,000	....
Increase in 1921	180,000	7%
" 1922	160,000	6%
" 1923	160,000	6%
" 1924	200,000	7%
Total planted	3,150,000	....

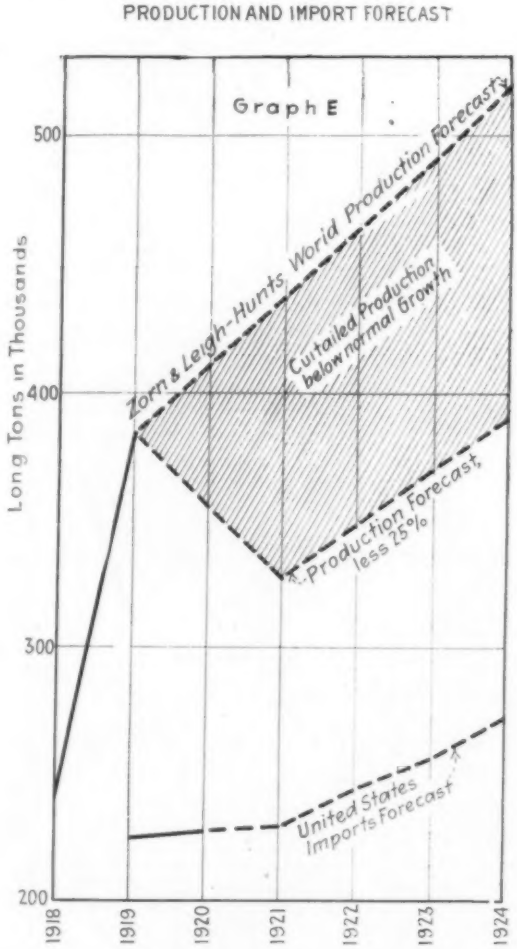
Having in view the fact of the proposed curtailment in production advocated by the Rubber Growers' Association of London, in which they advise a 25 per cent cut in production until present surplus stocks have been absorbed—a measure already in partial operation, I introduce Table VI and Graph E, which take into account the Zorn acreages with the 25 per cent reduction applied. In the last column I have made a forecast of America's imports, placing them on an average at 65 per cent of the production as modified by the curtailment figures.

TABLE VI

FORECAST OF PRODUCTION AND AMERICAN IMPORTS
(Pounds in millions; 000's omitted)

	Zorn Acres (a)	Total Acreage (a)	Production Pounds (c)	Production Tons	Production Less 25%	American Imports (d)
1919	2,450,000 (b)	2,450,000	855,366	381,860	286,390	226,032
1920	180,000	2,360,000	920,500	410,940	256,000	231,000
1921	160,000	2,790,000	976,500	436,000	327,000	229,000
1922	160,000	2,950,000	1,032,500	461,000	345,000	242,000
1923	200,000	3,150,000	1,102,500	492,000	369,000	258,000
1924	200,000	3,350,000	1,162,500	519,000	390,000	273,000

(a) Acres in bearing at years given.
(b) Increases in acreages.
(c) Basis of 350 pounds per acre.
(d) Based on America taking 65 per cent of production.



Raw Materials, in its September, 1920, issue, gives an interesting and instructive review of the rubber situation, more especially with respect to its bearing upon automobiles and tires. On page 117 it produces a table that is applicable to the study in question and I therefore reproduce it in part:

TABLE VII

RUBBER REQUIREMENTS IN THE AUTOMOBILE INDUSTRY

	1 Pounds of Rubber Consumed in Tires	2 Number of Cars Registered in U. S. A.	3 Increased Rubber Consumed in Tires Over Previous Years	4 Pounds of Rubber in Tires Per Car Registered
1913	65,880,000	1,254,971	.....	..
1914	89,830,000	1,711,339	23,942,000	52
1915	128,400,000	2,445,664	38,750,000	52
1916	185,650,000	3,512,996	57,250,000	52
1917	233,387,000	4,983,340	47,737,000	46
1918	248,000,000	6,146,617	14,613,000	43
1919	325,000,000	7,565,446	77,000,000	43

From an inspection of this table it will be seen that there is consumed in every car registered an average of about 43 pounds of rubber in tires. Applying this rate to the 70 per cent of our imports that go into tires, and to be distributed in the surplus, it will appear by reference to Table VIII, column 5, that, in 1921, there must be a registration of approximately 10,000,000 cars in order to use up this amount of rubber; increasing as imports increase up to 1924, when a registration of nearly 12,000,000 cars (11,800,000) must be had in order to use up the accumulated surplus and current imports.

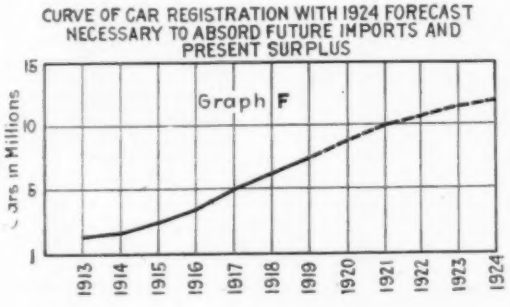
TABLE VIII

FORECAST OF CAR REGISTRATION IN ORDER TO ABSORB RUBBER IMPORTS SHOWN IN TABLE VI, PLUS THE EXISTING SURPLUS DISTRIBUTED OVER THE YEARS TO AND INCLUDING 1924.

(Reference to Graph F)

	1	2	3	4	5	6	7
1919	...	...	...	...	...	7,600,000	...
1920	...	...	...	...	...	8,800,000	...
1921	229	513	359	80	439	10,000,000	...
1922	242	542	379	80	459	10,700,000	...
1923	258	578	404	80	484	11,200,000	...
1924	273	612	428	80	508	11,800,000	...
Total increase, 1919-1920						4,200,000	...
Yearly increase, average						.....	11%

Note:
Column 1. Forecast of imports in thousands of tons.
Column 2. Same in millions of pounds.
Column 3. Seventy per cent of imports used in tires, millions of pounds.
Column 4. Seventy per cent of world's surplus of 200,000 tons distributed over four years—1921 to 1924, inclusive, in millions of pounds.
Column 5. Total rubber that must be absorbed, each year, in tires and tire sundries to take care of the imports and present surplus as distributed, in millions of pounds.
Column 6. Cars that must be registered to use up imports and the surplus
Column 7. Per cent of increase in cars registered each year.



The question arises, then, is the above too much of an increase in cars to expect under the conditions that now exist and that are likely to prevail during the next four years? Let us see.

From an inspection of Table VII it will be seen from column 2 that the average increase in car registration has been as follows:

1913 to 1914	36%	1916 to 1917	42%
1914 to 1915	43%	1917 to 1918	23%
1915 to 1916	44%	1918 to 1919	23%

In order to use up the imports and the surplus I have shown that a certain number of cars must be registered each year. See Table VIII. The rate of increase indicated is but an average of 11 per cent a year. This, compared with increases of anywhere from 23 to 44 per cent, should demonstrate that, with the curtailment of rubber production and importation I have mentioned and which seems likely to occur—indeed, it is now occurring, there need be no fear for the future of rubber surplus provided these restrictive measures are observed.

It does not seem to be apparent, as Zorn and Leigh-Hunt would have us believe, that there is any danger of a rubber shortage. The prediction of Mr. Rennie, of 1917, however, seems to have been amply verified, at least so far as prices are concerned. Now that steps have been taken to remedy the situation, this prediction—though at the time it was made it was thought to be entirely overdrawn, seems to have worked for good all around.

I do not think that any of the facts disclosed in this analysis need disturb the general feeling of optimism that exists in the trade, notwithstanding the fact of present depression. I have proved the fact of the rubber surplus statistically, demonstrating that, even with our lack of really reliable data of amounts of individual holdings, the "estimates" made by the trade are approximately correct.

No one who has closely followed the development of the automobile tire industry in this country doubts that it will continue to expand—perhaps not as rapidly as during the past few years, but in a normal healthy way that will easily take care of its share of the present rubber surplus and natural imports for the next few years.

A GROWING TIRE REPAIR SCHOOL

The tire repair school operated by The Miller Rubber Co., Akron, has been increased fifty per cent in space and equipment because of the growing demand for the course. An average of fifty students for the past few months has taxed the school to capacity, and the increased space will enable the company to handle 75 to 100 students at a time. New sectional and retread molds for heavy-duty tires have been added and a competent instructor employed to handle this phase of the work. Students of the Miller Tire Repair School are now divided into classes, including beginners, intermediate, senior repair men and special truck tire men. The course of four weeks' practical shop work is supplemented by a series of 24 lectures. Students are graded on each repair made, as a ticket is attached to each tire listing materials used, time of repair and the name of the student making repair. At the completion of the course both work and results of examinations are taken into consideration, and if a student passes favorably he is given a diploma certifying him an expert repair man. If his grade is only fair, he is advised to stay and master the work, but if he fails or does not show good work he is advised to stay out of the repair business. Main repairs are taken up in the following order: inside section, inside patch, quarter section and bead repair, half section, full section, tread patch, reliner and retread.

THE STANDARD GOLF BALL

Because it affects both players of golf and makers of golf balls, the most important of the several regulations adopted at the Anglo-American golf conference was that applying to the limitation of golf balls and their standardization. The rules committee and the American delegates decided to recommend that golf balls for official tournament play shall not measure less than 1.62 inches in diameter, nor weigh more than 1.62 ounces avoirdupois. Although this compromise decision is disappointing to many American players and discommoding to manufacturers, it is being accepted in a sporting spirit and is believed by leading American experts to have prevented the game from turning backward. The English wanted a standardized ball of the large "floater" type that would clip yards off the stroke of the best players. The Americans made a stand for the "Thirty" ball, the smallest and heaviest ball which comes within the new ruling and will maintain the present standard of the game, although it means the abandonment in international contests of the "Fifty" ball, which has won the most important tournaments of the past year.

Fluid Heat Transmission

By Alexander B. McKechnie[1]

THE ADVANTAGES of transmitting heat by means of a high boiling point fluid have been known for many years and several independent systems have been built and operated with more or less success. These systems consisted merely of a pipe coil or similar heater, a pump and some kind of a fluid. High flash point oil being easily obtainable was naturally the fluid chosen. These early systems operated for a short time, but soon commenced to give trouble and those that were used for the high temperature field were particularly short-lived, due principally to the carbonization of the circulating oil.

Heat transmission by hot oil embodies the desirable features and elimmates the objections of other methods for obtaining high temperatures. The quantity of heat delivered is under control at all times, and temperatures up to 550 degrees F. are reached without difficulty.

The pressure on the entire system is practically negligible, thus making it particularly adaptable to vessels with cast integral jackets usually built to withstand pressures of about 100 pounds and to the jackets of glass enamelled steel tanks designed only for pressures up to 75 pounds. This point is readily appreciated when we consider that the temperature of 100 pounds of steam represents only 338 degrees F. The distribution of heat is uniform over the entire surface of the vessel and its contents are treated instantly and uniformly without damaging the product.

The temperature can be controlled within close limits, either manually or by thermostatic devices. This is of vital importance in reactions where temperature variations in the heating medium are not permissible. Charts from recording thermometers show a temperature difference of from about 3 degrees F. to 7 degrees F. in the circulating oil when it is thermostatically controlled. The fire hazard is entirely removed, as there is no flame in contact with the vessels. The absorber furnace, the only place where flame exists, is isolated from the manufacturing equipment, and should conditions make it necessary the entire heating plant can be installed in a separate building.

DESIGN OF SYSTEM

There are five main factors in a system of this kind. They are as follows: Design of heater or absorber; type of circulating pump; type of system; quality of circulating oil; construction of pipe lines.

HEATER OR ABSORBER

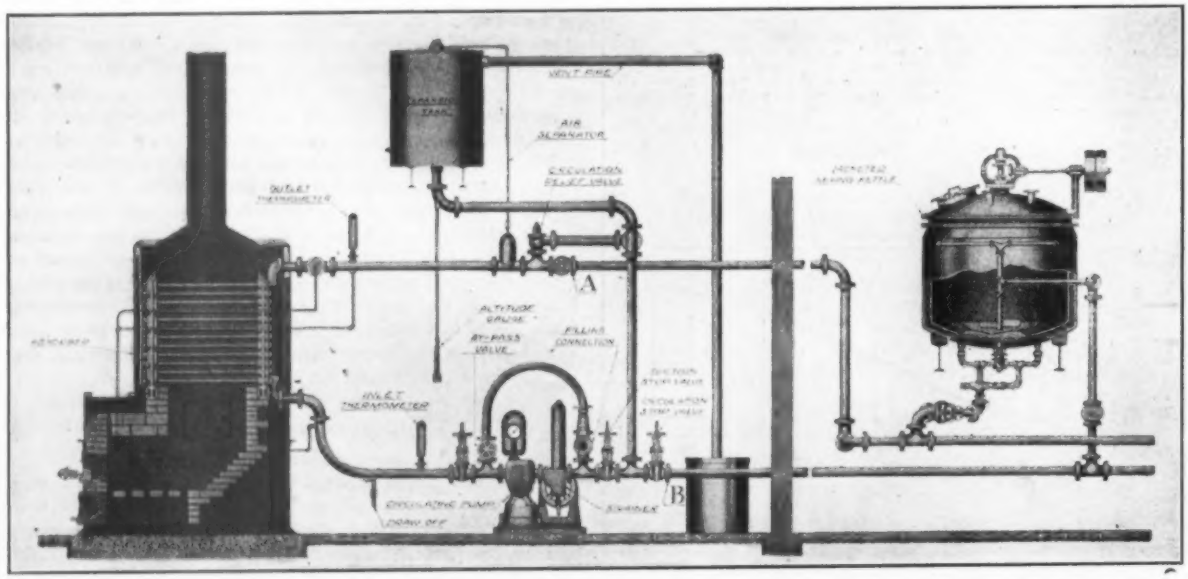
The absorber, like any other heat exchanger, must be designed for maximum efficiency, consistent with long life and freedom from trouble. It must be readily accessible for inspection or repair. The furnace must be built to withstand the high temperatures met in work of this kind and be thoroughly insulated to prevent undue radiation losses. Such points as the length and size of tubes, the velocity of the circulating oil and proximity of the fire to the tubes, all require careful study.

CIRCULATING PUMP

The circulating pump should be of the positive displacement rotary type to insure known and non-pulsating flow. The necessity for these features is apparent, because the temperature drop in the circulating oil is inversely proportional to the flow and a varying discharge pressure, particularly when starting a cold system, would produce excessive vibration.

TYPE OF SYSTEM

Experience has taught the superiority of the closed system shown in the illustration. By a closed system is meant one in which the hot oil does not come in contact with the atmosphere. This point is vital, as the oil would rapidly oxidize and soon become too viscous to pump freely, resulting in a decreased flow and the absorber tubes burning out, due to carbon deposit. Provision must be made, however, for expansion of the oil. The circulating oils generally used have a coefficient of expansion of about .000486, which means approximately a 25 per cent volumetric increase in 500 degrees F. rise. An expansion tank is placed



Parks-Cramer Co.

TYPICAL MERRILL PROCESS SYSTEM
SHOWN CONNECTED TO A LARGE JACKETED KETTLE, ABSORBER, AND FURNACE IN CROSS SECTION

[1]Engineer, Parks-Cramer Co., Boston, Massachusetts.

on the end of a dead or stagnant line attached at the proper point in the system which takes care of this point very satisfactorily. It also serves as a liquid seal and insures the exclusion of air. The expansion tank being vented to the atmosphere does not permit the building up of high pressure. A number of tests have shown the oil in the expansion tank to be about 300 degrees lower than the oil in circulation.

CIRCULATION OIL

It is very important that the circulating oil used should be carefully selected. It must have a high flash point and be free from all impurities. Viscosity and specific heat are also of importance. A number of tests show the specific heat increases with temperature on a straight line, its value being .62 at 550 degrees F.

CONSTRUCTION OF PIPE LINES

The transmitting lines for the circulating fluid are one of the most difficult and expensive features in a system of this kind. Ample provision must be made at all points for the expansion produced, which amounts approximately to 1/32-inch per linear foot. As hot oil of this nature is an exceedingly fugitive material, all castings and pipe joints must be so designed that there is no possibility of leakage. A pipe line constructed in the same manner as for steam would be merely a source of expense and trouble. It is practically impossible to use threaded joints above two inches, and sheet packings thus far have proved to be useless for the flanges. As the pressure is comparatively small, namely from 10 to 20 pounds per square inch, standard weight steel piping is satisfactory. There is no corrosion as the oil actually preserves the pipe. Steel flanges, screwed and welded to the pipe, prevent leakage at that point, and special design metal gaskets take care of the flanges. It is advisable to avoid joints as much as possible, so pipe bends and offsets are substituted for fittings. These parts in addition reduce friction, and vibration caused by column inertia.

FUEL

Compounds requiring temperatures that make it necessary to use an oil circulating system generally require also a uniform temperature in the heat applied. For this reason fluid types of fuel are used, and the most satisfactory results are obtained with either oil or gas.

It is probable, however, in the absence of either of these kinds of fuel that the absorber could be coal fired, and with proper attention make possible the maintenance of reasonably close temperature regulation.

APPLICATIONS

Installations for fluid heat transmission have been found useful in rubber factories in a variety of lines. Some twenty years ago the India Rubber, Gutta Percha & Telegraph Works at Silvertown, England, installed a complete rubber drying plant, using oil heat. The saving in time over air drying or even steam heated rooms was very great. The only criticism offered by rubber men was that the intense heat softened the rubber too much. As the finished goods did not suffer, this point was ignored.

Following the Silvertown lead, oil heating plants were established in France, Germany and Russia for drying rubber. One was also planned for an American factory. Just at this juncture came the vacuum dryer which in compactness, ease of installation and quick results fairly outclassed the oil dryer and handicapped it in what would have been a very general adoption by rubber manufacturers.

Nevertheless, the system has a fairly wide use in heating compounds for electric tape, and "dope" for insulated wire, and indeed for a variety of heating in special lines.

USED IN "RUBBER ROOFING"

Here the saturant is maintained as high as 425 degrees F., which is sometimes required. This temperature is easily obtainable. Due to the uniform temperature the machines can be operated at constant speed, and because of the high saturant temperatures that can be carried the felt can run through the saturant at maximum speed, thus increasing the hourly production and insuring a product of the highest quality and uniformity.

The hot circulating oil at approximately 475 degrees to 500 degrees F. can be passed through pipe coils set inside the tanks, which is the general practice in the asphalt field, or through jacketed tanks if necessary.

After the felt is saturated, it is allowed to cool and then passed on to the coating machine. The coating is a bitumastic material that flows on the saturated felt at a lower temperature and forms a protective coating, in reality hermetically sealing the prepared felt from the weather. The coating tank temperature ranges from 250 degrees to 350 degrees F.

Both saturating and coating tanks operate from one oil heating system and the temperatures of each are independently controllable by special oil by-pass valves installed at each piece of apparatus.

The study of the transfer of heat is also very interesting here. The conductance of the film between the pipe coil and the liquid asphalt is about ten B.t.u. per square foot per hour, per degree F. difference and because the conductances of the pipe and the film on the oil side is so high compared to this value, the overall coefficient is practically ten.

MANUFACTURE OF MINERAL RUBBER

In the manufacture of mineral rubber an uncarbonized blend of asphalt heavy oil residue is desired that shall be intimately mixed and of definite melting point. No better system of heating such ingredients has been devised than fluid heat transmission by circulation of the oil in the jacket of a double-walled kettle.

INSULATION

A plant manufacturing rubber-covered electric wire formerly operated on steam and could not maintain above 280 degrees F. in eleven dipping and polishing kettles. They were using 125 pounds steam pressure. Today the oil system operates at 14 pounds pressure and the required temperature of 325 degrees F. in tanks is uniformly maintained. Production has increased about 50 per cent and the quality has been vastly improved.

POOLING WAGES FOR VOLUME PRODUCTION

When it became necessary, a few months ago, to reduce tire production temporarily, owing to the slump in the automobile industry, The B. F. Goodrich Co., Akron, Ohio, laid off about 4,000 of the 29,000 operatives employed earlier in the year and began running three-hour shifts five days a week. In an effort to retain as many men as possible, the company decided to adopt a plan which had been used in a small way in one of the mechanical goods departments, with the result that the new system has increased output per man and is more satisfactory to both employes and the company.

The plan provides for "pooled" operations by various departments and payment is made on the basis of a certain volume of production, shared proportionately by the various members of each department. For example, the compounding department is told to deliver a specified amount of various compounds. The department is paid a fixed sum for each ton of compound delivered and the operatives of the department share proportionately in this payment. In other words, the men are not paid by the hour or day, nor do they operate on a piece-work basis. It is more or less a matter of volume. If eighty men in one group can deliver as much compound as one hundred men in another group, the members of the first group will receive individually more money than those of the second. This increases personal efficiency, for the men themselves see to it that no one shirks. At the same time, the company can regulate production in a more satisfactory manner than heretofore.

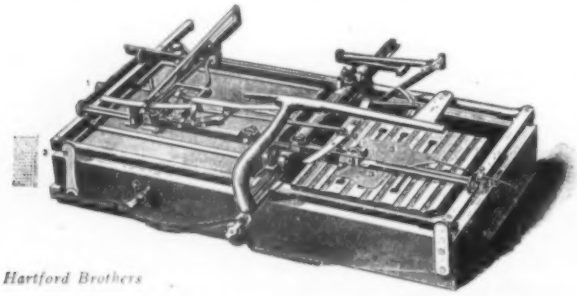
FOR THE FIRST SEVEN MONTHS OF THE CALENDAR YEAR 1920 Belgian exports of rubber to the United States were 432 tons, valued $333,300.

Rubber Shoe Designing and Pattern Making

By Robert C. Kelley, A. B.

WITHIN this generation, when a person asked for a pair of rubbers at a shoe store, the clerk went to the back of the store, pulled open a drawer containing a heterogeneous assortment tied together with red strings and sold him a pair which would stretch over the shoe. The question of fit was never considered, for the chances were that the dealer carried but a few ill-designed lasts.

Today the same store carries as many as a dozen lasts or styles of men's and women's light rubbers. The red string has



Hartford Brothers

COMBINATION SOLE AND UPPER GRADING MACHINE

gone. The clumsy, ill-fitting gum shoe has been replaced by its stylish, modern successor, wrapped in tissue and packed in a neatly labeled carton which reposes on the shelf along with the leather shoe.

The significance of this development in the rubber shoe industry is not to be underestimated. With it has come a chain of workers who bond together the leather and the rubber shoe industries and who have placed the craft of the rubber shoe designer on the same plane with the tire engineer and the originators of all modern utilities from women's corsets to men's collars. For the rubber shoe must now have style, fit and durability.

It is true that the styles in rubber shoes must follow those of leather shoes. But this is only a starting point. If the rubber footwear manufacturer attempted to get out a rubber to fit every last carried by the shoe dealers, he would soon find his outlay for lasts and patterns absorbing all the profits. Here is where the shoe designer finds his utility. He gets his ideas from his own sales force and the leather shoe trade. He attends every shoe style show, gathering information and watching the trend of styles. Of course, all shoe styles are modifications of previous models and in an established concern, part of the designing is, in reality, remodeling. But let us take, as an illustration, the case of a manufacturer who is just starting in the rubber footwear business. Before he can throw a batch of compound on the mill, he must design his lasts. The designer obtains samples of an assortment of leather shoes from the territories in which he expects to market his product. If they are women's shoes, he will have a varied line of high heels of the Louis type, of medium or Cuban heels, semi-high heels, low heels, long vamps, short vamps, high insteps and low, with a multitude of variations. He must analyze trade conditions to determine what kinds are the most popular and which ones are most likely to stay in vogue the longest. In many ways it a gamble, steadied by his judgment and knowledge of conditions.

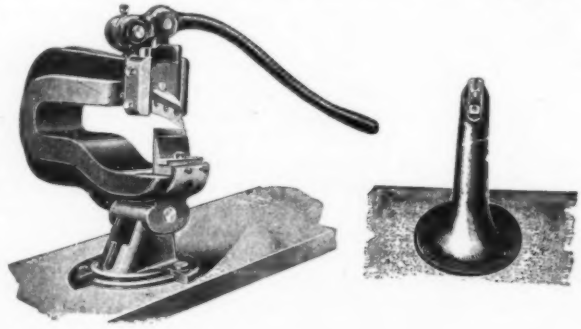
The next step is a grouping of the styles according to points of similarity. He simmers the groups down to individual shoes which possess the most points in common. The shoe ot each group that comes the nearest to the specifications of all of them is sent to the last maker, who reproduces a model of it in wood. It will be noted that the last over which the leather shoe was made will not answer the purpose, as the rubber is to be fitted over the leather shoe. This model brings him a step farther in the process. He may add to it, take off a little here and there, change the balance between heel and toe, as he compares it with the other models of the group, always keeping in mind the most popular and enduring styles.

When the model is finished, as far as he can tell from the evidence at hand, it passes to another worker in the chain, who fits up the last. This work requires an eye for artistic details and a thorough knowledge of rubber shoe construction. The fitter measures the height and depth of the last, and sets the gage line of the upper for a storm, half storm, or croquet, as the case may be. He traces the exact outline of the bottom of the last for what is known as the "bottom pattern."

After these measurements are taken, he must have samples of the stocks to be used on the inside work of the shoe to determine the percentage of stretch to the material, such as the net lining, made of cotton stockinette coated on one side. The parts of a woman's light rubber, exclusive of the gum outsole and upper, are: lining; rag heel or junior for stiffening the back, made of rag stock; the cloth heel made of light sheeting frictioned both sides; the insole, made of light sheeting coated one side with rag; the heel lift of friction to reinforce the heel; filler and toe cap, also of friction; and the joining friction strip which binds the seams. The lining must come up above the upper line on the instep and pull down smooth and tight when it is lasted over. This surplus stock is trimmed off after vulcanization.

The line of the upper is used to design the engraved roll for imprinting the bind, and margin enough is left to enable the gum to be pulled over the bottom of the shoe and lap in the back for seaming or stitching.

The insole, outsole and filler are all graded from the bottom pattern. The lines of the heel pieces (rag and cloth heel) are determined, first by the height, and then drawn with the aid of a French curve down the sides of the shoe. These first



Hartford Brothers

PATTERN SHEARS CORNER CUTTING MACHINE

patterns are cut from light cardboard and can be used to cut the parts for the model shoe. It is very rare that the parts fit perfectly after the first trial, and the fitter must go through the same process of experimentation that the designer did in modeling his last.

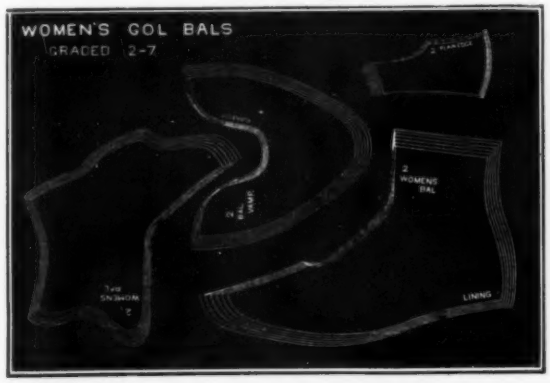
After the model rubber is made and cured, it is tried on the different shoes which it is made to fit, and any defects remedied. The salesmen are often consulted, and the shoe passed around for criticisms and comments. When its final form is settled

upon, the paper patterns are turned over to the patternmaker to be gotten out, and a set of lasts ordered from the last factory.

The making of patterns has been greatly simplified by the use of a grading machine such as shown in the illustration. Rubber shoe patterns for hand cutting are cut out of tin or planished iron from the cardboard originals and perforated with two holes, so that they can be fastened to the grading machine.

The pattern, which is usually a model size, such as 8 on the men's, and 5 on the women's, etc., is set in the machine, and the length and width measured on the indicators. A sheet of cardboard is then inserted in the lower bed of the machine and held in place by a clamp, operated by a foot lever. The movable carriage traverses the edge of the tin model, while at the same time a knife cuts its exact counterpart from the cardboard. The indicator is then reset for the other sizes in turn, which are cut in the same manner. This set of cardboard patterns, when stacked together, will be a run of sizes of the same model, as shown in the accompanying illustration of sole patterns after grading.

The patterns for cutting are made from these. In the rubber industry they are cut from tin or planished iron on a pattern



Hartford Brothers

BRASS AND STEEL-BOUND PATTERNS

shears, the edges ground smooth, and the pattern flattened out with a few taps of the hammer on a metal plate so that it will lie evenly on the stock for cutting. The sizes, widths, name of the part, last and date are stamped on the pattern for purposes of identification. In the leather industry, patterns are usually made of heavy cardboard, and edged with brass binding. For this work the pattern binding and corner cutting machines are employed.

The outsole pattern is of a different type from the others, in that an indentation must be made along the line that separates the shank and heel, and a hole cut out so that the trade mark or manufacturer's brand can be centered by the cutter. Wellman outsole machine patterns are made of thick composition metal with a beveled edge, so that the knife may traverse the edge and give a proper skive to the sole.

On all shoes that have steady and large sales, the parts, such as linings, insoles, fillers, etc., are cut by dies on clicking machines or beam presses. These dies are made by the diemaker from the paper patterns furnished by the patternmaker.

It will thus be seen that the shoe designing and pattern departments of a rubber shoe factory, large or small, are increasing in their importance and usefulness. And it is not to their discredit to have a new last go out to the trade, be welcomed as a perfect fit and design, only to have it discarded a few months later and have the manufacturer's supply of dies, lasts and patterns sent to the salvage department to be sold for firewood and old metal. Styles are fickle things, and often are beyond human power to predict.

There are countless other features of rubber footwear designing which change from time to time, but fortunately do not always involve a change of lasts or patterns. Among some of the improvements brought out in late years may be mentioned extension toes and heels, self-acting features, suction non-skid soles on athletic footwear, various color combinations on uppers, soles and trade marks. All of these have been developed by rubber shoe designers for the expansion of business through

Hartford Brothers

SAMPLES OF GRADED SOLES

increased utility of the finished product. In this field the rubber chemists, production, sales and technical men work closely together, that all factors may be considered.

The introduction of machine-made gaiters and arctics has brought new fitting problems into rubber footwear, and with it has come a closer relation between rubber and leather shoemaking, the machines for the most part being adapted from the leather shoe field. How far this relation will be carried will be answered by the measure of success attained by machines in displacing hand labor, which has stood the test so many years in rubber footwear manufacturing.

INDUSTRIAL ENGINEERING IN RUBBER FACTORIES

By Malcolm C. W. Tomlinson[1]

THE mechanical and electrical equipment of any factory represents a very large percentage of the capital invested. Unless such expenditures are analyzed carefully the net returns will fail to pay the interest on investment after operating expenses are met. Furthermore, analysis will often save a manager from tying up money in side issues such as power plants. But it must be borne in mind that analysis of technical questions is impossible without costs based on solid ground and also without technical aid. As the purchase and operation of equipment is seldom the result of intensive study, remarkable savings are often possible where such methods are put in practice. A number of cases will serve to illustrate the point. In two factories the bill for drinking water ran over $2,200 per year and averaged from $3 to $5 per employe. The installation of refrigerating systems cut down the water bill to less than $1 per person and paid out in two years' time. A boiler room was able to dispense with five boilers and three firemen as a result of a daily log and thus saved $9,000 yearly without the expenditure of one cent. In another plant a fortune was spent on grease and oil for lubrication but no attempt was made to recover one drop by filtration or separation when a saving of from 15 to 25 per cent was easily possible. A power plant which contained a low pressure turbine was producing electricity for 5 cents a k.-w.-hour with coal costing $3.50 per ton and a much smaller plant with poorer equipment located in the same town sold power at a slight profit for 2 cents. Similar examples of waste are occurring every day in most of our rubber factories and the facts usually remain hidden until the proper investigations are undertaken because these items can not be analyzed by cost departments.

The average executive will frankly admit that his costs are only worked out to the tenth or hundredth of a cent but will insist that they are accurate to that point. His accountants know better but believe that the expense of obtaining accuracy is ex-

[1]The author, a prominent consulting engineer, writes from a wealth of knowledge gained by his connection with such firms as the Baldwin Locomotive Works, the National Tube Co., the laboratories of the National Board of Fire Underwriters, The B. F. Goodrich Co., The McGraw Tire & Rubber Co., etc.

cessive. The fact remains that cost data on the production and departmental usage of water, steam, electric power, electric light, gas and air can only be obtained by the aid of technical engineers versed in making tests and investigations, that most of the plants in the larger industries have been obtaining this information for the past ten years, that the expense is very modest for smaller sized plants and that competition can be met by such methods.

INDUSTRIAL ENGINEERING'S FIELD

Certainly industrial engineering covers a broader field than that indicated. With the aid of the accountant it will cut out wastage in every department of our modern factory. Emphasis has been laid especially on analysis of equipment needs and on securing true cost data because therein lies a great opportunity for economy which is sadly neglected, for, though most industrial engineering firms are prepared to systematize factories and correct production errors by time and motion study, very few are equipped to make the necessary tests and investigations into the usage of those fundamental elements of manufacturing mentioned before: water, steam, electric power, electric light, gas and air. But there are many reasons why factories should do this work themselves when possible and thus reduce the expense. In such cases it might only be necessary to employ competent engineers to make the fundamental tests and investigations, to lay out a method of procedure and to supervise the installation of the system.

That engineering is a broad subject is seldom appreciated by factory managers. The civil, electrical, mechanical, industrial, chemical and mining divisions have subdivisions such as structural, sewage, electro-chemical, etc. It is, therefore, unfair to expect one engineer to have adequate training and experience over the whole field. Furthermore many mechanical, industrial or electrical engineers in factory work have had little or no practical experience in tests, investigations and research work. For this reason they are not competent to pass on many problems that arise and, in such cases, an engineer familiar with the problem should be employed.

THE MANAGER AND THE ENGINEER

Before we proceed it is best to point out that the factory manager and the technical engineer must each view industrial engineering in a broader light. The executive must realize that price alone ought not govern the purchase of equipment but that quality, delivery and maintenance cost should be considered; that there is as vast a difference between operating engineers, draftsmen and technical engineers as between surgeons and practicing physicians and that the safe harbor between low and high priced labor or equipment, while indefinite, can be found only by means of technical aid and analysis. The engineer must understand money values; have a wide experience with machinery and equipment; reject as unworthy of consideration propositions which will not secure prompt returns in profits; comprehend the ratio between income and investment and remember that his special value to industry is in his ability to analyze, to systematize and to effect economies.

The regulative principles of industrial management are as follows:

(a) The systematic use of experience.
(b) The economic control of effort.
(c) The promotion of personal effectiveness.

The author would broaden the third principle to include machinery and equipment. Industrial engineering must be employed to give business the full benefit of the principles enunciated, as the engineer's experience covers a field unknown to those who have not had such training; the control of effort, or time and motion study, has been developed by the engineering profession and the effective use of the human being as well as of the machine requires the aid of engineers.

ADVANTAGES OF ENGINEERING

Some of the advantages of engineering which can be had by various departments of a rubber factory are:

MANAGEMENT AND GENERAL OFFICE: (a) Reports, estimates and analysis of conditions and equipment set forth in simple language and illustrated with curves and graphic charts.

COST DEPARTMENT: (a) Aid in obtaining true costs on production and distribution of electric power, light, air, water, steam and gas by means of tests and investigations. (b) advisory capacity on special costs; (c) rate fixing and bonus setting advice; (d) critical analysis, from an engineering viewpoint, of cost reports; (e) time study; (f) motion study; (g) systematic methods of recording data.

PURCHASING DEPARTMENT: (a) Technical advice as to relative merits of various classes and makes of machinery and equipment; (b) tests and inspections of new and second hand machinery before purchasing; (c) analysis of bids or proposals on equipment.

STORES DEPARTMENT: (a) Modification of the perpetual inventory to meet local needs; (b) systematizing records and methods.

SHIPPING AND RECEIVING DEPARTMENTS: (a) Systematic records and methods.

PRODUCTION DEPARTMENT: (a) Reduction of machine-hour losses by better maintenance; (b) elimination of losses due to grounds, improper maintenance, imperfect alinement, excessive friction and poor lubrication; (c) proper routing; (d) unit systems of control and inspection; (e) air conditioning and humidity control to increase efficiency of employees and to reduce power required for milling; (f) light distribution to increase production.

MECHANICAL DEPARTMENT: (a) Estimates for building and equipment repairs or replacements; (b) establishment of daily log in power plant and monthly report on same; (c) tests and investigations of all kinds; (d) research work; (e) analysis of factory conditions for the management; (f) systematic supervision of maintenance work and power plant operations; (g) fire prevention, sanitation and safety engineering; (h) analysis of daily reports on percentage of "seconds" with a view to improvement of core and mold equipment or methods of production; (i) design of special machinery and equipment for production to reduce labor costs. This includes such items as special gearing to reduce power costs in milling; (j) building and equipment inspection; (k) improved methods of tempering and grinding tools; (l) design of special jigs and fixtures.

COST OF INDUSTRIAL ENGINEERING

The increased overhead burden of installing an adequate engineering department or of hiring an outside engineer will be offset by the economies effected. Just how much the return may be depends on the ability of the engineers entrusted with the work, the condition of the plant, and the willingness of the management to make expenditures. When such work has been neglected for years it ought not to be surprising if the expense of rectifying mistakes should be large. One cannot remove from a business profits which should have been used for improvements and then expect to have results. Where such conditions exist it is very often possible to institute great savings on slight expenditures. In one case of this kind an investment of $9,000 for equipment represented a saving of $75,000 yearly; but this can be considered as an exceptional case and part of these savings were made with little or no expense whatsoever.

EXPORTS OF AUTOMOBILE TIRES FROM THE UNITED STATES TO Holland during the first six months of 1920 were valued at $760,000 as against $59,600 for the corresponding period of 1919. Imports of crude rubber from Holland to the United States during the first half of the current year amounted to $1,807,200.

Dry Heat Varnishes and Their Manufacture

THE MANUFACTURE of varnish for dry heat goods, such as footwear and surface clothing, is really an oil-boiling proposition, and does not call for the huge chimneys nor the retorts of the old-time gum varnish maker. In boiling linseed oil, large kettles are used, the cold oil occupying one-third of the interior, and even then it sometimes boils over. The varnish house with its inflammable contents is as carefully segregated from other buildings as is a cement and naphtha house.

In preparing the oil varnish, the principal point is getting the fluid up to about 300 degrees F. and as quickly as possible and holding it there for several hours. The final stage is an increase of heat that causes frothing or boiling. This is continued until the liquid becomes viscid.

Back in the beginning of rubber shoe manufacture, what was known as the original Goodyear varnish was used. The ingredients were:

Linseed oil, boiled thick	10 gallons
Sulphur	10 pounds
Pulverized rosin	45 ounces
Camphene	10 gallons
Naphtha	15 gallons

The oil and rosin were first mixed together cold and heated up to 290 degrees F. The sulphur was then added and allowed to stand 40 minutes. Next, the heat was run down to 215 or 220 degrees F. and the camphene added. Then the heat was

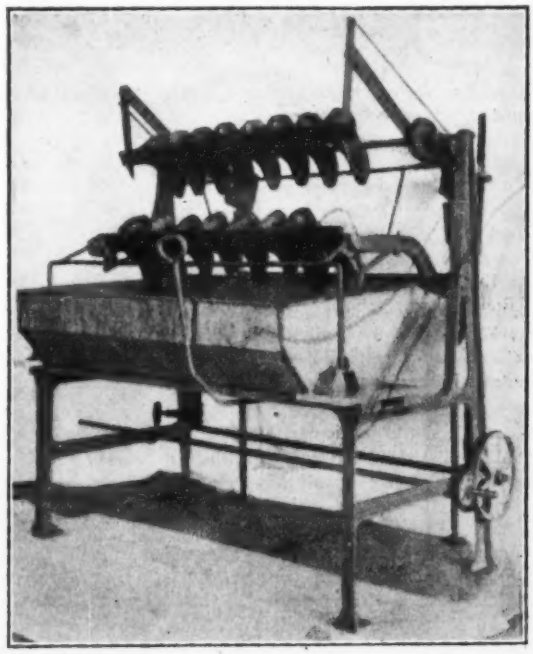
ERICKSON'S SHOE VARNISHING MACHINE

run down to 150 degrees, the naphtha added and let stand until cold. Lastly, enough naphtha was added to bring it down to 50 gravity.

A more modern formula is:

Best raw linseed oil	32 gallons
White sugar of lead	1½ pounds

Boil these ingredients together until the oil is thick and viscid, and let it stand until cold. Then take 12 gallons of the above and heat it up to 290 degrees and add 7½ pounds of sulphur. Keep stirring and let the heat run up to 360 degrees. Then let it stand for 30 minutes. Then run the heat down to 150 degrees. Add 12 gallons of naphtha, and keep stirring until it gets cool.



WALL'S SHOE VARNISHING MACHINE—IN POSITION FOR DIPPING

A rubber shoe varnish used in Norwegian mills is made as follows: 8 kilograms of linseed oil, to which are added 1,170 grams of sulphur. Mix 8 grams of rosin with 40 grams of magnesia or 50 grams of lime, and add to the first mixture.

A very cheap shoe varnish is:

Well boiled linseed oil	10 gallons
Sulphur	10 pounds
Naphtha, 62 gravity	34 gallons

Primarily, rubber boots and shoes on lasts or trees were given the varnish coat by a broad brush in the hands of a skilled varnisher. Later, a dipping trough was used, in which each shoe was carefully immersed, slowly drawn out and drained before placing on the heater car. This, in turn, was displaced in 1906 by the Erickson varnishing machine. This in brief was a varnish tank fitted with an agitator to keep the varnish in homogeneous solution. A rack of ten shoes placed in the upper part of the tank was slowly revolved, dipping all of the shoes at once and giving each an even coating of varnish. With this machine four men could do the work of ten by the hand dipping process.

Two years later the Wall machine appeared. This needed but two men to operate it. In operation a stick of eight shoes is clamped over the varnish tank, a lever pulled, and the shoes descend into the varnish, are raised up by counter-weights and automatically transferred to a draining rack. Operated by one man, 500 pairs of shoes an hour are varnished. Two men, however, can handle 1,200 pairs, so it is naturally a two-man machine.

CARRIAGE CLOTH, AUTO TOP, AND SURFACE CLOTHING VARNISHES

Rubber automobile top cloth and carriage cloth are given a coating of vulcanizing varnish, often containing a pigment, which

is applied in a coating machine after the rubbered cloth has received an impressed representation of the grain of leather by means of an embossing machine. The rubber and varnish vulcanize in one operation. The time of cure is generally 2½ to 3½ hours at 250 degrees F., or 3½ to 4½ hours at 250 to 260 degrees F., depending upon the grade of goods. These varnishes are made in a dull, semi-bright, and gloss finish:

A good formula for this varnish consists of:

Linseed oil	1 gallon
Sulphur	1 pound
Naphtha	2½ gallons
Morrison's dryer	1 gallon

Varnishes for surface clothing are usually known as water varnishes. A good luster formula is:

Water	6 gallons
Shellac	3 pounds
Neutral chromate potash	1 pound
Borax	18 ounces

Heat until dissolved.

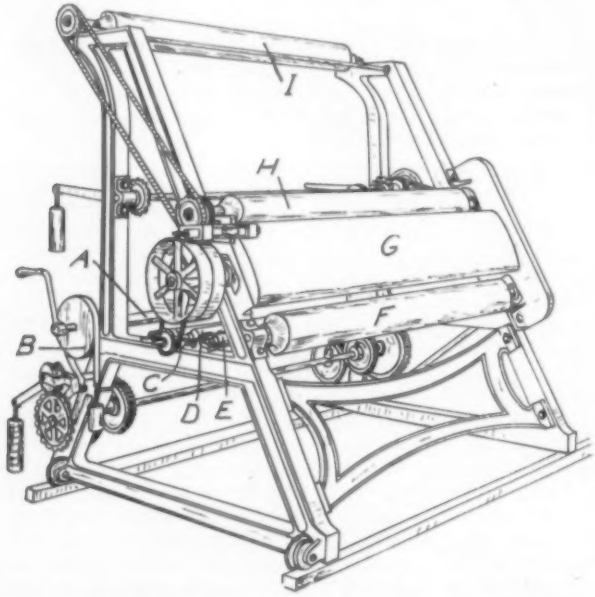
For a dull finish, add aniline to the above.

An English formula for water varnish is made as follows:

Boil a quantity of borax in water for 20 minutes. Decant the clear liquid from the undissolved borax and let cool. Add its own bulk of water; bring to a boil and digest therein for 20 minutes thin shavings of Ceara or Madagascar rubber.

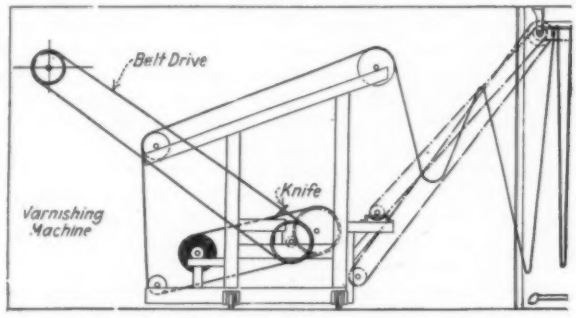
A very curious formula is found in *Elmer's Clothing Varnish.* This was designed particularly for an elastic varnish for fabrics that had already been coated with his "Elastic Selinide of Caoutchouc." It consists of a paste made of one part of alumina to two parts of ichthyocolla, the solvent being a mixture of one part oil of birch to thirty parts of naphtha. After application, the surface is partially dried and then subjected to a strong solution of tannic acid for 6 to 12 hours. It is then subjected to steam for 30 minutes.

Varnish was applied to carriage cloth by brushes when the business was young. Later several machines, all excellent, were



BIRMINGHAM CARRIAGE CLOTH VARNISHING MACHINE

evolved. They are a trifle more complicated than other varnish applying mechanisms and are best shown in outline. The illustration shows the Birmingham machine for varnishing carriage cloth and delivering the cloth to the drying room. The rubber coated cloth is hung in bearings at the back of the machine on a square bar *A*, which is provided for a friction device *B* to regulate the tension. The cloth is then passed under an idler roller *C*, over the varnish roller *D*, under another idler *E*, and



SINGLE TEXTURE FABRIC VARNISHING AND FESTOONING MACHINE

then to the front of the machine. The varnish roller revolves against the coated side of the goods, applying the varnish which it has picked up from the tank in which it runs. After being varnished the cloth passes under a roller *F* and over a zinc-covered table *G*. Here it is smoothed out and the wide surface gives an opportunity to inspect the varnished cloth and to retouch any knots or defects. A knife is provided immediately behind the varnish roller to scrape off the surplus varnish. From the inspection table the cloth passes over a roller *H* and over a roller *I* at the top of the frame, and then to the festooning apparatus which picks up the cloth and drapes it in festoons which are carried into the curing room.

These heaters are usually made 50 feet long and about 12 feet high. The machine is mounted on rollers so that when one heater is full it is run to the next heater. It is so geared that all parts are driven from one belt.

MOTOR CAR PRODUCTION FOR 1921 TO EXCEED ALL RECORDS

As forecasting what may be expected in the tire industry, the price reductions in the automobile industry have proved effective in stimulating the sale of cars. Alfred Reeves, general manager of The National Automobile Chamber of Commerce, reports that after two months of depression there has been an upward turn in the sale of both passenger cars and trucks. Present production is not averaging more than 50 per cent, except in the case of three or four factories, but the full year, he asserts, will exceed all records, approaching 1,900,000 cars and 340,000 trucks. Car renewals are at the rate of about 1,000,000 cars a year. It is logical and healthful, he believes, that an industry which increased 350 per cent in five years should undergo re-adjustment along with other industries. The 1920 Ford production alone is estimated at about 900,000 cars, and Mr. Ford has been quoted as saying that the 1921 output would be at least 1,250,000 cars. The major part of the tires fitted to Ford cars at Detroit before shipment come from Akron and are largely Firestone.

"PEERLESS" TIRE PAINT

The perfectly turned-out car does not of necessity depend upon the shop for its good looks, thanks to paints specially prepared for the car owner's use. Peerless Tire Paint is one of the latest additions to the Peerless line of automobile finishes. It is a durable protective coating and adds much to the appearance of spare tires as well as tires on the car. Peerless Tire Paint is made in three colors—black, white and gray.—The Columbus Varnish Co., Columbus, Ohio.

The Viscosity of Rubber

By A. M. Munro[1]

IN ORDER, on the one hand, to secure adequate control over the compounding and vulcanizing of manufactured rubbers, and on the other, to be in a better position to trace to their origin obscure differences in the physical and mechanical properties of finished goods, suitable methods are urgently needed for the evaluation of raw rubber, as it enters the factory.

At the present time the "variation" of raw rubber is one of the most perplexing problems faced by the manufacturer and the chemist. The problem is acknowledged to be, in the main, a physico-chemical one, complicated by the existence in a sample of raw rubber of an unknown number of colloidal aggregates of widely different physical properties and subject to variation in quality according to the amount of mechanical "breaking down" or other treatment which they may have received. Again many factories have not yet standardized their buying of crude rubber, with the result that the manufacturer is compelled to work in ignorance of the history of any particular consignment of rubber; age of the trees, seasonal variations, quality of the soil, method of coagulation, degree of milling and washing, length of storage before shipment, and a number of other factors being unknown or, at least, uncertain quantities.

However, in the face of these many and obvious difficulties it appears to the writer that the desired goal of rubber evaluation and standardization will eventually be reached along the lines of physical and physico-chemical measurement, and with this in view he has commenced a series of researches on the viscosity of rubber.

In this paper, which is of a preliminary nature, he ventures to put forward a few of the results which have been obtained up to the present date, together with a description of the experimental methods employed.

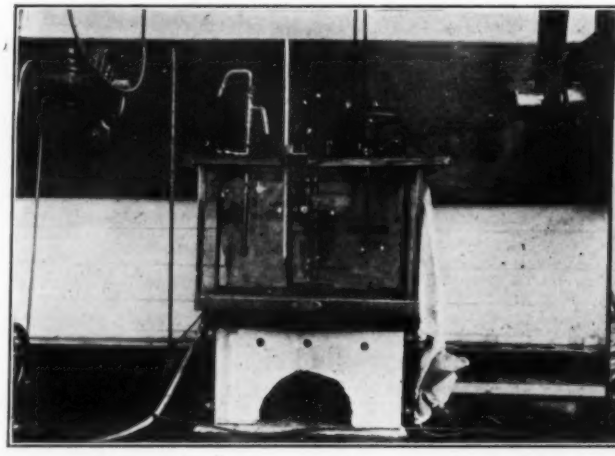


FIG. 1. THERMOSTAT FOR VISCOSITY WORK

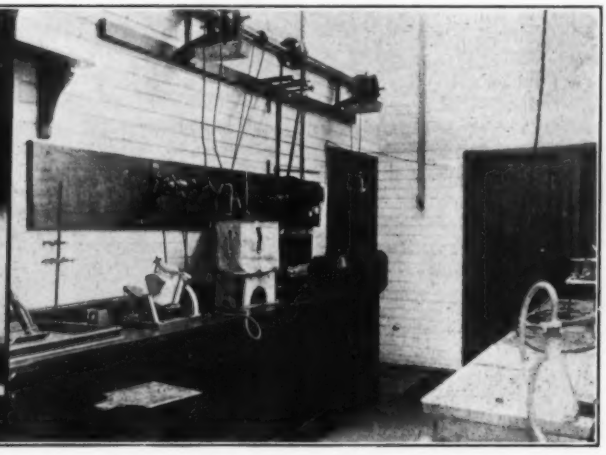


FIG. 2. RESEARCH BENCH, SHOWING THERMOSTAT AND POWER-DRIVEN SHAKING MACHINE

HISTORICAL

Axelrod, to whom the idea of studying the viscosity of rubber first occurred, worked with benzene solutions and observed the time taken by 100 cc. to run through a capillary from a containing vessel. The ratio of this figure to 4.5, he called the viscosity of the solution. He proposed at this time (1906) to apply the method to the evaluation of rubbers.

Schidrowitz, and later Frank, took up this question again, and the latter put before the International Testing Committee a new viscometer. Frank employed xylene as a solvent and his solutions contained 3 per cent of rubber. The apparatus was standardized with pure glycerine. Schidrowitz and Goldsborough in 1909 attempted to establish a relation between the "nerve" of a rubber and the viscosity of its solutions. Their experiments showed that a relationship does appear to exist but that it is not direct, "nerve" being determined by two different factors, one of a mechanical nature and the other chemical (polymerization). Schidrowitz used the Ostwald type of viscometer, employing 1 per cent benzene solutions and calculating the viscosity in terms of the solvent as unity. The rubber content of the solution was determined by evaporation of the solvent at the end of the experiment. For the sake of comparison he made mechanical tests and found that the indications of the viscometer were of a comparative value from the point of view of the determination of elasticity.

It will be noticed in the above work that little has been done to compare the suitability of the many rubber solvents for the measurement of viscosity, to investigate the influence of varying temperature, or to correlate the viscosity value with the other chemical and physical constants of the sample. Most important of all, none of the results has been expressed in absolute units.

APPARATUS

In order to carry out an accurate series of measurements of viscosity, the writer has set up the apparatus shown in Figs. 1 and 2. The thermostat employed for securing constant temperatures consists of a glass tank, measuring 18 inches in length by 9 inches in width, by 13 inches in depth. The framework and bottom of this tank are of sheet copper. The water contained in this tank is stirred by a good sized propeller, driven from overhead shafting, which power supplied by a ¼-h.-p. electric motor; while heating is effected by a gas burner placed below the tank, which is itself supported on an iron stand.

The gas supply is regulated by a toluene-filled Ostwald thermoregulator placed in the water. Temperatures are read by means of a standard Centigrade thermometer, graduated in tenths of a degree. In order to minimize loss of heat by radiation and irregular cooling, the tank and stand are both covered with asbestos cloth, holes being provided for observation of the

[1] Chief chemist, Dunlop Rubber Co. of Australasia Ltd., Montague, Australia.

viscometer. The tank is also fitted with a movable wooden lid, while an electric lamp placed at the back insures sufficient illumination.

So far, viscometers of the Ostwald type have been employed, the bore of the capillary being chosen to suit the thickness of the particular solution in use. The viscometers are supported in the water in a vertical position in a wooden stand designed for the purpose.

It has been found that the temperature of this thermostat can be regulated to within one-tenth of a degree without any difficulty, and can be maintained constant for long periods.

UNITS OF MEASUREMENT

Instead of comparing the viscosity of the rubber solutions with some arbitrary liquid such as glycerine or with the pure solvent itself, as has been previously done by all investigators of the subject, the measurements have been calculated to an absolute value. In the Report of the Chemical Society, of London, on the Progress of Chemistry it is strongly advised that in future all viscosity measurements should be expressed in absolute values. In this way numbers can be obtained which will be entirely independent of the type of apparatus used and of the conditions of the experiment and which can be repeated by others.

For purposes of calculation the viscosity of a liquid may be defined as the force which will move a unit area of plane surface with unit speed relative to another parallel plane surface, from which it is separated by a layer of the liquid of unit thickness. This force, measured in dynes per square centimeter, is called a "poise" and a hundredth part of this unit is termed a "centipoise." The centipoise has been adopted as the unit for all the viscosity measurements described below.

In the Bulletin of the American Bureau of Standards for 1917, tables are published giving the viscosity of solutions of pure sucrose (cane sugar) and of mixtures of ethyl alcohol and water, expressed in centipoises, for different concentrations and temperatures. These values have been made use of in standardizing the viscometers employed.

EXPERIMENTAL

The first series of measurements described in this paper deals with the viscosity of different kinds of plantation rubber dissolved in chloroform. The solutions all have a concentration of 1 per cent and are made up by shaking the weighed amount of finely divided rubber with known volume of pure chloroform in a power-driven shaking machine.

In Table I are to be found the chemical constants which were first of all determined for the rubber samples.

TABLE I

PALE AND LIGHT AMBER CRÊPES FROM DIFFERENT ESTATES. FIRST GRADE RUBBERS FROM FIRST LATEX.

Serial No. for Reference	Caoutchouc by Difference, Including Proteids Per Cent	Resin Per Cent	Moisture Per Cent	Mineral Matter Per Cent
1	96.93	2.62	0.28	0.17
2	96.77	2.65	0.30	0.28
3	97.01	2.40	0.30	0.29
4	97.15	2.38	0.22	0.25
5	97.13	2.30	0.30	0.27

The viscosity values were as follows:

Serial No.	Viscosity at 25 Degrees C. in Centipoises
4	41.6
3	37.5
1	34.6
5	27.3
2	22.5

Examination of these values will show that, generally speaking, a high viscosity is associated with a low resin and high caoutchouc content, while a low viscosity corresponds to a high percentage of resin and a lower caoutchouc content.

In Table II are drawn up the results obtained on a number of high grade smoked plantation sheets from different estates.

TABLE II

Serial No. for Reference	Caoutchouc by Difference, Including Proteids Per Cent	Resin Per Cent	Moisture Per Cent	Mineral Matter Per Cent
8	96.81	2.61	0.34	0.24
9	95.81	3.38	0.47	0.34
10	96.27	3.05	0.40	0.28
11	96.29	2.92	0.58	0.21
12	96.75	2.52	0.48	0.25
13	96.15	2.89	0.50	0.40
14	95.95	3.23	0.42	0.40
15	95.87	3.25	0.60	0.28
16	96.41	2.56	0.64	0.36
17	96.87	2.47	0.48	0.18
18	96.84	2.60	0.40	0.16
19	96.67	2.50	0.34	0.23

Serial No	Viscosity at 25 Degrees C. in Centipoises
15	26.6
13	25.9
17	25.2
19	25.2
18	23.9
11	23.8
14	23.8
8	21.8
12	21.8
16	21.8
10	19.1
9	16.3

Examination of these values will show, that with one or two notable exceptions, including No. 15, there is again a tendency for low resin content to correspond with high viscosity and vice versa. Moreover, on the average the resin contents are higher than those of the pale crêpes and the viscosities correspondingly lower.

Samples Nos. 6 and 7 which are not included above were two lower grade compound crêpes and their viscosities were 17 and 19.8, respectively.

A certain number of determinations were carried out of the tensile strengths of a trial compound made from different samples of rubber. The breaking strain of rings cut from the compounds was measured on the Schopper machine and the result calculated from the dimensions of the rings to pounds per square inch. The results were as follows:

Viscosity values were as follows:

Serial No.	Tensile Strength in lbs. per sq. in.	Viscosity
13	1,923	25.9
11	1,689	23.8
12	1,662	21.8
17	1,615	25.2
16	1,502	21.8
18	1,479	23.9
15	1,343	26.6

These preliminary experiments support Schidrowitz's view that the relation between viscosity and tensile strength of the rubber is not direct. Further work on this point is required and the writer hopes to undertake it shortly.

The only conclusion which may be of some value which can be drawn from these early experiments seem to be that the viscosity of rubber solutions in chloroform is modified in the case of high grade plantation rubbers by their resin content in the way described above.

RUBBER FILLER

Ground tufa rock of specific gravity 2.25 is being advocated as a filling ingredient for general rubber compounding. Its composition is given as chiefly silica and alumina with small percentages of lime, magnesia, oxide of iron and compound of sodium and potassium. It shows loss of 6.5 per cent on ignition.

THE MILLER RUBBER CO. HAS BEEN HIGHLY COMPLIMENTED ON the striking window display which it is offering to dealers in its products. It consists of reproductions in eight colors of original pantings by means of the Tullograph oil color reproduction process, in which no ink is used, but only oil and paint, so that the colors will stand up under sun and rain and can be cleaned with a damp cloth. This makes the display adaptable for out of doors if desired.

What the Rubber Chemists Are Doing

The "Slope" or "Type" of the Rubber Stress-Strain Curve[1]

By Dr. O. De Vries

IN a recent paper[2] Schidrowitz, Goldsborough and Hatschek have discussed the nature of the stress-strain curves of vulcanized rubber-sulphur mixtures, and especially the mathematical solution of these curves as belonging to the couchoid family. The figure for "slope" or "type" plays a prominent rôle in these calculations.

Doubtless the slope of the stress-strain curve is an important figure, representing as it does the increase in load necessary to produce a certain elongation. The fact that the stress-strain curve at high elongations (at least for rubber-sulphur mixtures, with which this paper deals exclusively) ends in a straight line, so that the slope of this part of the curve is a constant, gives a special importance to this figure, which represents the resistance to stretching, or the distensibility, at high elongations. The higher the figure for slope of this part of the stress-strain curve, the more easily the vulcanized product already stretched to ten or more times its original length, yields to a further increase of load, and the weaker it is.

SLOPE OR TYPE

Schidrowitz and his coworkers have called this property "type." It shows markedly the differences between higher and lower grades of rubber, and is a better index of the properties of the lower grades than the tensile strength, the figure for which, in such cases, is often uncertain because of the presence of particles of dirt, etc. The different grades of plantation-rubber, in our testing work, gave the following figures for "slope" or "type," determined by the method of Schidrowitz:

	Average	Normal Figures	Limits
First quality crêpe	35·8	34—38	33 —39
Smoked sheet	36.7	35—39	33 —40
Crêpe from lump	37.3	35—38½	33½—40
Crêpe from tree scrap	38.8	37—41	35½—44½
Crêpe from bark rubber	42.9	40—43	38 —47½
Crêpe from earth rubber	37.6	36—39	34 —40
Crêpe from washings	39.1	37—41	35½—46

The highest figure was 53[3], found in a sample of very inferior crêpe from washings; the lowest figure, 32, is sometimes met with in crêpe from matured rubber.

Especially when figures of 40 or higher are found for slope, the sample may be expected to be inferior, and the higher figures generally indicate a rubber which on keeping is liable to become tacky. Whether in the first grades a difference in slope between 35 and 38 has any practical importance, remains to be seen. Though, theoretically, a rubber with a slope of only 34 to 35 is stronger and therefore preferable, it is not yet clear whether the difference is sufficiently great to affect the manufacture.

DETERMINATION OF "SLOPE"

The determination of "slope" is easy and necessitates no additional testing, as the stress-strain curve obtained in the determination of tensile strength may serve to read the slope also; and as slope represent a separate property, independent of tensile strength of rate of cure, it certainly deserves more attention than has hitherto been given to it. The more dependent properties one takes into consideration, the better a substance with properties so complicated as rubber can be judged.

It has been shown[4] that a close relationship exists between the slope and the permanent set, when both are determined for mixtures of 92½ rubber and 7½ sulphur, vulcanized to our standard state of cure (length of 990 per cent at a load of 1.30 kilograms; coefficient of vulcanization approximately 5). The closer nature of this relationship has not yet been worked out, but there appears to be no doubt that this relationship is founded on the intrinsic properties of the vulcanizate, and that there is one factor—be it structure, composition, or some other—which causes a certain rubber to stretch easily at high elongations, and that at the same time, after releasing, show large deformation.

CHARACTERISTICS OF "SLOPE"

It is not yet clear which intrinsic property of the rubber is responsible for the slope, and which factors in preparation have an influence on it. From our investigations the following facts are brought out:

(1) The slope becomes greater (the rubber less resistant to stretching) by prolonged and heavy tapping.

(2) The slope decreases by maturation[4] (decomposition on keeping the still wet coagulum, giving a quick-curing rubber); it also decreases by the use of sulphite and bisulphite in the latex, which prevent surface-oxidation and discoloration of the coagulum.

(3) The slope increases by coagulation with alcohol[5], by the action of lower organisms causing spots on crêpe, and by traces of copper salts, causing tackiness; also by strong heating of fresh, wet coagulum.

It would seem that the slope is smaller (the rubber better), the purer the rubber is, and greater, the more decomposition-products are present. The exact nature of these changes is, however, far from clear. Addition of foreign substances (such as gypsum or talc) to the rubber-sulphur mixture does not alter the slope, which also remains the same for mixtures with different contents of sulphur.[6]

"SLOPE" AND INCREASING TIMES OF CURE

One of the chief points which Schidrowitz and his coworkers bring forward is that the upper ends of the stress-strain curves for different states of cure run parallel, and that the slope, determined by their method, is a constant, not changing with increasing times of cure.

This is certainly not correct for curves obtained by our method of testing. We have on several occasions[7] reproduced sets of stress-strain curves which show clearly that the slope of the upper straight part is greater for less cured samples, and becomes smaller and smaller the further the sample is cured. This was regularly found to be the case in our testing of thousands of samples. Table I gives some figures representing this decrease in slope with increasing time of cure.

The same difference may be noted in the sets of curves published by B. J. Eaton and his coworkers for mixtures of 90 parts of rubber and 10 of sulphur; though no figures are given, and the slope of the curve, in whichever form, is not determined in their testing work, the reproductions often[8] show clearly enough that the end of the curve becomes less steep the more the cure

---

[1]Journal of the Society of Chemical Industry, September 30, 1920, 308T.

[2]Journal of the Society of Chemical Industry, 1919, 347 T; THE INDIA RUBBER WORLD, December 1, 1919, 149.

[3]Journal of the Society of Chemical Industry, 1919, 92T.

[4]O. de Vries and H. J. Hellendoorn. Journal of the Society of Chemical Industry, 1917, 1260.

[5]O. de Vries, Archief voor de Rubbercultuur, 1918, 2, 237, 97 and 557; 1920, 4, 217.

[6]O. de Vries and H. J. Hellendoorn, Journal of the Society of Chemical Industry, 1919, 38T; The India-Rubber Journal, 1919, 57, 1165; Archief voor de Rubbercultuur, 1918, 2, 783, 791.

[7]Journal of the Society of Chemical Industry, 1919, 91T; India Rubber Journal, 1916, 52, 717; 1919, 57, 1163; Archief voor de Rubbercultuur, 1917, 1, 217; 1918, 2, 771.

[8]Journal of the Society of Chemical Industry, 1916, 715, 1046; and Agricultural Bulletin, F. M. S., No. 27.

is advanced. Even the set of curves reproduced by Schidrowitz[9] would seem to show a similar difference.

While therefore the upper, straight ends of the curves do not run parallel for increasing times of cure, we have further to consider whether the slope, determined by Schidrowitz's method, that is, 0.4×(length at 1.04 kilograms—length at 0.60-kilogram) remains constant. Schidrowitz and coworkers find this to be the case in their method of testing. We do not find constancy in our testing; the slope, determined by Schidrowitz's method, increases with increasing times of cure. We have often controlled this fact for the curves obtained in testing large samples, and invariably found this increase in slope for increasing times of cure.

The figures in Table I may be cited as an example. The state of cure is indicated in the first column by the position of the stress-strain curve in our usual manner, i. e., by its length at 1.30 kilograms. The second column gives the difference in length for 0.20-kilogram increase in load, or the slope of the upper part of the stress-strain curve in per cent when drawn on the scale of the Schopper machine. The third column contains the slope determined by Schidrowitz's method.

TABLE I

Length at 1.30 kg.	Slope of Upper End	Slope (Schidrowitz)
1070	33.6	34.7
1050	32.2	35.1
1030	30.8	35.4
1010	30.1	35.7
990	29.9	36.0
970	29.7	36.35
950	29.5	36.7

The changes in both properties are clearly illustrated by this table. It is of importance for the study of the exact nature of stress-strain curves that the slope of the upper part of the curve becomes smaller (the curve flatter) on increasing the time of cure, while the slope determined by Schidrowitz's method shows a gradual increase. The two methods therefore do not give results which run parallel for increasing states of cure.

It is not yet apparent what differences in method of curing or testing cause this divergency in our case, while in Schidrowitz's testing they remain constant. The mixture is nearly the same (Schidrowitz's testing 8 sulphur on 100 rubber, in our own 7½ on 92½, or 8.1 on 100). The temperature of vulcanization, room-temperature during testing, and probably minor details in method of curing and testing differ.

While therefore the mathematical formulas for the stress-strain curves, evolved by Schidrowitz and his coworkers, are not strictly applicable to our testing results, there is a strong indication that these authors are nevertheless on the right track with their speculations on the deeper nature of the stress-strain curves. They conclude that for each sample there is a correct or optimum state of cure, represented by a conchoidal curve for which $a = b$, and giving an ideal balance of properties, the toughness (tenacity) equalling the limit of extension. This optimum state of cure is calculated to lie lower on the paper, the higher the figure for "slope" or "type." We have shown[4] that the maximum tensile strength is a property which follows this law; it is found lower on the paper, the higher the figure for slope. This proves, in our view, that Schidrowitz and his coworkers, in their mathematical speculations, have arrived at the truth, though their formulas probably present the case in too simple a form. In a former paper we have given some figures for the position of the maximum of tensile strength for samples with different slopes. As the maximum of tensile strength in our mixture is rather flat, it is difficult to determine the exact position of the curve, which gives a maximum tensile strength. Combining all our published and unpublished results, we estimate the length at 1.30 kilograms of the curves giving the maximum tensile strength at 992 and 957 for slopes of 36 and 40, respectively.

[9] Journal of the Society of Chemical Industry, 1919, 347T, Figure 1.

TABLE II

Slope after Schidrowitz.....	34	36	38	40	42
Slope of upper part of curve.....	27.5	29.9	32.2	34.6	37.0

Schidrowitz and his coworkers give for the correct cure the following extensions at a load of 1.04 kilograms per square millimeter: 884 and 850. This means a length of 984 and 950 times the original; using our figures from Table II, and assuming, as is approximately true, that the curve has already reached its straight part at a load of 1.04 kilograms, we calculate the lengths at 1.30 kilograms for Schidrowitz's correct cure as 1023 and 995 for slopes of 36 and 40, respectively. These figures are higher than ours, but the difference in length, distance between the curves, is very similar, 38 against 35 units.

Strict comparisons are impossible as the methods of curing and testing differed; it cannot be said whether Schidrowitz's correct cure and the maximum of tensile strength coincide or not. A relationship between the two is, however, very probable.

SUMMARY

The slope of the stress-strain curve, that is the increase in load necessary to obtain a certain increase in length, or, in other words, the resistance to stretching, is a property well worth attention in rubber testing. Determined after the formula of Schidrowitz and Goldsborough it gives besides tensile strength and rate of cure, an independent property, which is especially typical in judging lower grades, and which, by its direct relationship to permanent set seems to have a deeper meaning.

The mathematical solution of the stress-strain curves as conchoidal curves evolved by Schidrowitz, Goldsborough, and Hatschek, does not strictly hold good for our method of testing; the conclusions of the above authors as to a "correct" cure are, therefore, not generally applicable. Still, the parallelism between this supposed "correct cure" and the actual maximum of tensile strength tends to show that a relationship exists, though the mathematical formulation may be more complicated than that supposed by Schidrowitz and his coworkers.

PHENANTHRENE

One of the newest coal tar derivatives for which commercial applications are now being found is phenanthrene. This is an aromatic hydrocarbon closely related to anthracene. In physical appearance when pure, it is a white crystalline solid with a melting point of 100 degrees C. It is being marketed as a distilled product of approximately 80 per cent purity, which grade appears to be suitable for most commercial purposes. A more refined product could be furnished, however, to meet special requirements.

Phenanthrene is especially interesting to the rubber manufacturing industry as a wax substitute. It is used to replace carnauba, ceresin, stearic acid, paraffine and other waxes in wire insulation and other rubber work.

DETERMINING THE SPECIFIC GRAVITY OF PIGMENTS

For the determination of the specific gravity of a pigment a 50-cc. pycnometer with kerosene as wetting medium has been found most satisfactory. In order to remove all occluded air from the pigment, it is necessary to apply a vacuum of not more than three millimeters for from one-half to two hours before completely filling the pycnometer and weighing at 15.6 degrees C. The pigment must be thoroughly dry.

CHEMICAL PATENTS

THE UNITED STATES

SULPHUROUS AND SULPHURIC ACIDS AND THEIR ANHYDROUS AND gaseous forms, generated by the oxidation of the rubber in vulcanized rubber goods having a foundation fabric, are neutralized by subjecting the goods to a suitable heat and treating them in a hermetically sealed chamber with undiluted ammonia gas

under the greatest pressure possible without injury to the goods, whereby the gas is enabled to impregnate the rubber throughout, and then removing the heat and pressure, causing the gas to remain imprisoned in the elastic pores of the rubber.—William Edgar Muntz, London, England. United States patent No. 1,354,123.

COMPOSITION FOR TREATING FIBROUS MATERIAL CONSISTING OF asphalt; a metallic oxide sulphur; a vulcanization accelerator; and a solvent liquid for certain of these substances.—William D. Pardoe, assignor to Thermoid Rubber Co., both of Trenton, New Jersey. United States patent No. 1,354,996.

IMPERMEABLE AND NON-HYGROSCOPIC MATERIAL CONSISTING OF vulcanized fiber coated with a film of celluloid of acetyl-cellulose firmly adhering to the surface.—Mario Arosio, Milan, Italy. United States patent No. 1,355,586.

VULCANIZED CAOUTCHOUC AND PROCESS BY WHICH VULCANIZATION is effected consisting in incorporating with a caoutchouc mix an alkyl substituted thio-urea accelerator having an alkyl group in ortho position and then vulcanizing the mix.—Winfield Scott, assignor to The Goodyear Tire & Rubber Co., both of Akron, Ohio. United States patent No. 1,356,495.

PROCESS FOR TREATING FIBROUS MATERIAL AND THE PRODUCTS obtained thereby. The process consists of treating fibrous material which comprises applying thereto a lubricant dissolved in a volatile solvent, evaporating the solvent and treating the material so prepared with a vulcanizable plastic, the proportion of the lubricant being relatively small to obviate deleteriously affecting the bond between the fibre and plastic. The lubricant includes castor oil and beeswax.—Alfred E. Jury, Newark, New Jersey, assignor by mesne assignments to Morgan & Wright, Detroit, Michigan. United States patent No. 1,356,920.

THE UNITED KINGDOM

VULCANIZING INDIA RUBBER IN SOLUTION IS EFFECTED BY THE addition of sulphur and small quantities of nitroso-benzene or a similarly constituted nitroso-hydrocarbon of the cyclic series. In an example, ten grams of rubber and one gram of sulphur are dissolved in 150 grams of carbon disulphide. Six-tenths of a gram of nitroso-benzene is added and the solution shaken. In about 30 minutes the solution sets to a jelly, which, on evaporation of the solvent, yields vulcanized rubber, insoluble in the solvents for raw rubber.—S. J. Peachey, 5 Yew Tree Road, Davenport, Stockport, England. British patent No. 146,734.

INDIA RUBBER. Rubber previous to vulcanization is mixed with a proteid substance, such as glue, which has undergone decomposition or hydrolysis. The proteid after hydrolysis with alkalies, alkaline earths, etc., may be treated with carbon dioxide. The resulting product is preferably mixed with water to form a paste or jelly and incorporated with rubber, which is then dried and vulcanized. The proteid substance may be added to the rubber in various proportions from 5 to 30 per cent.—The Goodyear Tire & Rubber Co., assignee of C. W. Bedford, both of Akron, Ohio. British patent No. 146,992.

INDIA RUBBER. Filling, coloring, or like materials in powdered form to be incorporated with rubber are mixed with a colloidal solution, for example, glue, which is then incorporated with the rubber, dried and vulcanized. To prevent the glue from hardening, pine oil, asphaltic oils, turpentine, glycerine, etc., may be added to the mixture.—The Goodyear Tire & Rubber Co., assignee of R. C. Hartong, both of Akron, Ohio. British patent No. 146,993.

JAPAN

ACCELERATORS FOR VULCANIZATION OF RUBBER. A solution of sodium or potassium in primary or secondary aromatic amines is used. Ten parts by weight of sodium or potassium in 100 parts by weight of aniline oil, diphenylamine or toluidine is especially suitable.—D. F. Twiss and The Dunlop Co. Japanese patent No. 34,944.

OTHER CHEMICAL PATENTS

GERMANY

PATENTS ISSUED, WITH DATE OF ISSUE

NO. 328,610 (February 20, 1917.) Method for making soft and elastic vulcanized products. Farbenfabriken formerly Friedrich Bayer & Co., Leverkusen near Koln-on-Rhein.

328,611 (February 3, 1917.) Method for the acceleration of vulcanization. Stanley John Peachey, Heaton Mersey, Manchester, England.

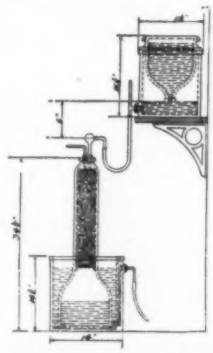
329,171 (January 3, 1917.) Method for the preparation of synthetic rubber materials which in consequence of lack of viscosity and elasticity can not be easily worked upon cylinders. Akkumulatorenfabrik Akt.-Ges., Berlin.

329,293 (February 6, 1916.) Method for the manufacture of a material, similar to leather or celluloid, resisting acids and not soluble in benzine. Stanley John Peachey, Heaton Mersey, Manchester, England.

LABORATORY APPARATUS

HYDROGEN SULPHIDE GENERATOR

THE apparatus here illustrated is one of the most convenient for the purpose of supplying hydrogen sulphide for large laboratory or small manufacturing requirements.



PARSONS AUTOMATIC GENERATOR

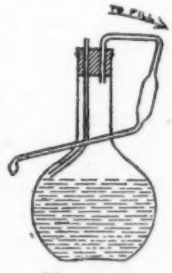
Hydrogen sulphide is essential for many chemical tests and manufacturing operations. The newest application is probably in the Peachey patented process of cold vulcanization.—Eimer and Amend, 211 Third avenue, New York City.

CONTAINER FOR ALKALINE SUBSTANCES

A container of fibrous material has been patented, the inner surfaces of which are coated with a solution of cellulose ester mixed with a non-solvent and with a material to render the coating when dried less brittle, rendering the surface of the container impervious to the action of moist alkalies.—The Research Laboratories Co., assignor of G. W. Howlett, both of Toledo, Ohio. United States patent No. 1,355,976.

AUTOMATIC MEASURING DEVICE

A very convenient automatic measuring device by A. W. Lorenz, for use in routine analyses to measure reagents with speed and reasonable accuracy, is here shown.



MEASURING FLASK

The bottle can be handled with one hand, and with greater convenience and speed than in pouring from a bottle in one hand into a measuring cylinder in the other. At the same time, measurements are quite as accurate, and perhaps more so, than rapid measurements from a graduated cylinder. The device will consistently deliver amounts varying by not more than one half a cubic centimeter.

In using, the bottle is tilted back in the direction of the arrow, to a horizontal position, when the pipette will fill rapidly, then bring the bottle to its normal position and the pipette will deliver its charge.

The device is constructed of an ordinary wash bottle and pipette of the desired size. The angles to which the tube of the pipette is bent should be substantially as shown, so that it will fill without trapping air, and deliver rapidly. The bulb of the pipette should be as close to the bend on the delivery end as possible, so that undelivered solution may run back in the bulb without trapping air bubbles. The small bulb at the end is to prevent the splashing of drops, forced up by air bubbles, while filling the pipette. The bottle should never be quite filled and the air tube leading into it should project above the surface of the liquid at all times.

THEORY OF ACCELERATION IN VULCANIZATION

THE well known French rubber chemist, André Dubosc, recently published[1] his very illuminating theory on acceleration of vulcanization of rubber in the case of such organic accelerators as piperidine, para-nitroso-dimethyl aniline, hexamethylene tetramine and thio-carbanilide. Incidentally he regards Spence's discovery and introduction of organic vulcanization accelerators as marking as important an epoch in the development of the rubber industry as the discovery of vulcanization by Goodyear.

The author's theory, for which he does not claim perfection, clearly accounts for the hitherto unexplained singular and energetic action of the accelerators mentioned. The leading features of the author's paper are given in the following abstract:

REACTION OF AMINES WITH SULPHUR

If a known accelerator, hexamethylene tetramine for example, is mixed with sulphur, placed in a sealed tube, and heated for a few minutes at 135 to 145 degrees C., it is found that besides sulphide of carbon or hydrosulphuric acid, sulfocyanic acid is generated. All organic accelerators derived from amines inevitably give this same reaction.

PRODUCTION OF HEXAVALENT SULPHUR

At the vulcanization temperature, sulfocyanic acid separates, yielding hexavalent sulphur and cyanhydric acid. The latter body, kept at vulcanization temperature, combines in the presence of ordinary divalent sulphur, producing unstable sulfocyanic acid, which by dissociation again furnishes hexavalent sulphur. If the temperature is kept constant, the reaction continues while free divalent sulphur remains.

This is a catalysis where the cyanhydric acid acts as catalyzer. Its practical effect is to transform ordinary divalent sulphur into hexavalent sulphur, the action of which during vulcanization is entirely different. This variation of valence in an elementary body is common.

ACTION OF HEXAVALENT SULPHUR

Hexavalent sulphur, freed at the time of dissociation of sulfocyanic acid, is susceptible in vulcanization of saturating three free double bonds belonging to rubber with which it is in contact. These double bonds may belong either to two different molecules of rubber or to three. A single molecule of rubber reacting with ordinary, divalent sulphur will saturate only one double bond.

SPEED OF VULCANIZATION

If vulcanization is considered as the saturation, by sulphur, of a certain number of free double bonds in the rubber molecule and three such bonds, instead of one, are saturated in a given time, the speed of the reaction will evidently be tripled.

It is found, experimentally, with most of the accelerators containing an active amino group, that the time needed for vulcanization is reduced in the proportion of three to one. This is the case with piperidine and thio-carbanilide. If the accelerator contains several active amino groups the reduction of time for vulcanization may be considerably further reduced. This is the case with hexamethylene tetramine or furfuramide.

The hypothesis explains the modification of the speed of vulcanization by the liberation of hexavalent sulphur by dissociation, resulting from the products of decomposition of the initial accelerator and the sulphur of an intermediary body (sulphocyanic acid). This is a case of catalysis by stages: first, there is decomposition of the initial accelerator producing a catalyzer, cyanhydric acid; second, the sulphur of the mixing or the hydrosulphuric acid combines, generating sulfocyanic acid, which, third, dissociates furnishing hexavalent sulphur and regenerating the catalyzer, cyanhydric acid. Thio-sulfocarbanic acid, which, according to Kratz[2] and Bedford,[3] is present in all reactions due to accelerators, also leads to the formation of sulfocyanic acid and the liberation of hexavalent sulphur under the influence of heat, with saturation of three double bonds of the rubber in reaction, and regeneration of catalytic cyanhydric acid. In fact, this latter would seem to be the true accelerator and to correspond with Spence's "active principle."

If it be admitted, as Kratz has observed, that the cyclic nucleus of accelerators is broken during vulcanization, it easily explains the formation of sulfocyanic acid. This hypothesis also explains why, in rubbers vulcanized with the aid of accelerators, there is never found a trace of these bodies, either in the aqueous, or in the acetone extract. They are not true accelerators but under suitable conditions of temperature they are capable of generating, by decomposition, a catalyzer which will react on the sulphur. This catalyzer, cyanhydric acid, which remains in the mass after vulcanization, in the form of sulfocyanic acid, or rather, of sulphocyanates, insoluble in consequence of combinations with the charges, can be determined by Chelle's method for cyanhydric acid, which is used in toxicological analysis.

INCREASE IN TENSILE STRENGTH

Rubber vulcanized in the presence of accelerators shows marked increase of breaking strength over the same rubber vulcanized in the ordinary manner. This change seems to indicate that rubber vulcanized in the presence of accelerators is more highly polymerized than that treated without accelerators. These facts of practical experience have, up to the present time, remained unexplained. Our theory affords a means of explanation. In fact, if we admit the formation of hexavalent sulphur during vulcanization, it is easy to see the cause of the change of polymerization which occurs.

Reverting to Weber's theory of vulcanization[4], we know that the different molecules of rubber united to each other, form physical aggregates, a kind of open chain preserving at each end a double bond which will saturate an atom of divalent sulphur in ordinary soft vulcanization. In this case polymerization is limited to a single aggregate containing a smaller or larger number of molecules.

Considering the action of accelerators, let us admit that they generate hexavalent sulphur. As already explained, this body may react on free valences of two or three molecules of rubber. In explanation of this, our theory provides that on the same atom of hexavalent sulphur polymerization will take place as follows:

(1) In the case of an aggregate of rubber molecules, the end molecules of which have a double bond, these will be broken and give a molecule of rubber of which the four valences will be saturated. The aggregate will have its polymerization increased by one molecule and its resistance to break will be modified, in a slight degree only.

(2) In the case of vulcanization by hexavalent sulphur, saturation of the terminal free valences of three physical aggregates of rubber will take place. Polymerization will therefore be three times as great as that produced by ordinary vulcanizations, because it acts on three aggregates instead of one. Resistance to break, dependent on polymerization, will therefore be very notably increased and theoretically ought to be tripled, and this has been demonstrated experimentally.

THE CASE OF NITROSO ACCELERATORS

At first sight the theory seems to apply only to accelerators of the amino (NH_2) or imino (NH) groups and to leave out the nitroso compounds discovered by Peachey, but such is not the case. The nitroso bodies decompose during vulcanization and generate cyanic acid. The latter, under the influence of sulphur, yield sulphurous anhydride and sulfocyanic acid. The sulfocyanic

[1] Le Caoutchouc et la Gutta Percha, September 15, 1920.
[2] "The Effect of Certain Accelerators Upon the Properties of Vulcanized Rubber," THE INDIA RUBBER WORLD, June 1, 1919, page 485; November 1, 1920, page 95.
[3] "Reactions of Accelerators During Vulcanization," THE INDIA RUBBER WORLD, January 1, 1920, page 206.
[4] "The Chemistry of India Rubber," 1906 edition.

acid dissociates and leaves hexavalent sulphur, and the liberated cyanhydric acid again functions as a catalyzer, as indicated above. Thus, nitroso compounds would seem to react in the same way as the aminic accelerators.

The theory therefore is general and the true accelerator is cyanhydric acid. In the presence of divalent sulphur, it changes into unstable sulfocyanic acid at vulcanization temperature. Under these conditions, the valence of the sulphur having been modified to the hexavalent condition, is in the course of vulcanization, while the regenerated cyanhydric acid would then continue the cycle of the reaction.

THE DETERMINATION OF TRUE FREE SULPHUR AND THE TRUE COEFFICIENT OF VULCANIZATION IN VULCANIZED RUBBER[1]

By W. J. Kelly[2]

IT IS the object of this paper to present two methods, one for the true free sulphur determination and the other for a more accurate figure for the coefficient of vulcanization than could be obtained by the older methods.

The sulphur present in vulcanized rubber may be divided into four parts:

Sulphur soluble in acetone: (1) combined with resins and proteins; (2) true free sulphur.

Sulphur insoluble in acetone: (1) combined with rubber; (2) combined with resins and proteins.

METHODS FOR DETERMINING TRUE FREE SULPHUR

Considering first the sulphur which is soluble in acetone, it is evident that a solvent which would dissolve either the sulphur or the organic material (part of which may contain sulphur of combination) without affecting the other, would solve the problem. Unfortunately, all solvents for either will dissolve both to a greater or less extent. The entire extract very readily dissolves in 95 per cent alcohol. The alcohol will also dissolve about 0.04 grams of sulphur in 100 cc., the amount of sulphur usually obtained in an ordinary analysis. If, however, the extract is treated with alcohol already saturated with sulphur, it will dissolve all of the organic material present but none of the elementary sulphur. The sulphur remains in the flask after the solution is decanted, and can be weighed as such or oxidized and weighed as barium sulphate.

PREPARATION OF SATURATED ALCOHOL.—The saturated solution of sulphur in ethyl alcohol, to be referred to as "saturated alcohol," is made by heating an excess of sulphur with the alcohol for about three hours at 70 degrees to 75 degrees C. and allowing to cool slowly to room temperature. Before used it is allowed to stand at least 24 hours in order to insure complete crystallization of the dissolved sulphur. As all later crystallizations are carried out at room temperature a variation of a few degrees in the temperature at which equilibrium is reached does not materially affect the results. As a precaution, however, the solution is kept in contact with solid sulphur to insure saturation at all times.

DETAILS OF METHOD.—A one-gram sample of the ground rubber is extracted with acetone for 16 hours, in an Underwriters' apparatus. The acetone is distilled off, the residue dried at 60 degrees to 65 degrees for half an hour and treated with 50 cc. of saturated 95 per cent alcohol, and the flask and contents weighed. An accuracy of 0.5-gram is sufficient for this weighing. It is then warmed to about 50 degrees C. for a few minutes to insure complete solution of all the organic material and allowed to cool slowly to room temperature. Before it has reached this temperature the flask is again weighed and any alcohol lost during the heating is replaced with pure 95 per cent alcohol. The flask is then well covered and allowed to stand for 24 hours to permit the complete crystallization of any of the elementary sulphur of the extract which may have dissolved. The liquid is then carefully decanted, and the residue washed two or three times by decantation with 5 cc. of saturated alcohol and dried. It may then be weighed directly, or oxidized and weighed as barium sulphate.

It is unnecessary to wash the residue with pure alcohol inasmuch as the amount of sulphur left by the evaporation of the saturated alcohol is very slight. One cc. of 95 per cent alcohol will dissolve only 0.0004-gram of sulphur and it is easily possible to decant the liquid so that not over 0.52-cc. will remain in the flask.

COEFFICIENT OF VULCANIZATION

The combined sulphur in rubber stocks has been considered to be the sulphur which was not extractable with acetone. In case inorganic sulphides were present a correction was made. As stated above, however, it is possible that some of this sulphur may be combined with resins and proteins in acetone-insoluble compounds. Hence, a method whereby the residual sulphur could be determined after these compounds had been separated from the rubber would give a much better value for the coefficient ot vulcanization.

It has been shown[3] that about 85 per cent of the resin of *Hevea* rubber is saponifiable. Such being the case, it is probable that part at least of any resin sulphur compounds which are insoluble in acetone would also be saponifiable and rendered soluble in alcoholic potash. The protein matter will also be hydrolyzed and some of these products will dissolve in the alcoholic solution. In any case any sulphur extracted by this method will not be sulphur which has been combined with the rubber. The many failures to remove the combined sulphur by any means substantiate this view.

The experiments of Spence[4] show that all of the free sulphur is extracted by acetone in about 8 hours, and hence it is probable that a 16-hour extraction will remove every trace of it.

A few experiments showed that from the stock used to determine the true free sulphur, alcoholic potash would remove an additional 0.30 to 0.35 per cent of sulphur. In order to show that this was not due to the removal of sulphur combined with the rubber or to the disintegration of the sample, successive extractions were run on the same piece. Two 4-hour extractions removed all the sulphur, absolutely no precipitate of barium sulphate being obtained when the third and fourth extracts were oxidized and treated with barium chloride.

DETAILS OF METHOD.—A one-gram sample of ground rubber is extracted 16 hours with acetone and the residue dried. It is then boiled for 8 hours with 75 cc. of a 5 per cent alcoholic potash solution and washed once or twice with hot alcohol. As the removal of the last traces of alkali is very difficult the sample is extracted 16 hours (over night) with alcohol in an Underwriters' apparatus. The solutions are then mixed and the alcohol distilled off. The residue is oxidized first with 15 cc. of a solution of bromine in potassium bromide (120 grams potassium bromide and 160 grams bromine in one liter of water) in order to prevent the violent action of fuming nitric acid on alkali, and finished with nitric acid. The barium sulphate is precipitated in the usual manner.

As there is always considerable silica formed from the glass it is necessary to evaporate twice with hydrochloric acid, thoroughly dehydrate, and remove the silica before precipitating the sulphate.

APPLICATION OF METHODS

These methods were applied to a series of cures on a stock made up of 100 parts of pale crêpe and five parts of sulphur.

[1] Abstracted from the paper read before the Rubber Division of the American Chemical Society at St. Louis, Missouri, April 12-16, 1920.
[2] Research Laboratories, The Goodyear Tire & Rubber Co., Akron, Ohio.
[3] Hinrichsen and Memmler, "Der Kautschuck und seine Prüfung."
[4] Kolloid-Zeitschrift, 9, 300.

The results are given in the table below as parts of sulphur per 100 of rubber:

Cure Hours	True Free S	Sulphur in Alc.-KOH Extract	Coefficient of Vulcanization	Sulphur in Resin and S. Compounds (Sol. in Acetone) (by Difference)
0.5	4.39	0.00	0.61	0.00
1.0	3.93	0.00	1.03	0.04
1.5	3.74	0.03	1.21	0.02
2.0	3.18	0.03	1.63	0.16
2.5	2.54	0.07	1.93	0.46
3.0	2.12	0.13	2.30	0.45
3.5	1.76	0.26	2.51	0.47
4.0	1.27	0.33	2.88	0.52
4.5	0.85	0.49	3.14	0.52
5.0	0.54	0.34	3.54	0.58

From these results it is evident that the theories of vulcanization proposed in the past, none of which took into account the formation of these compounds, are based on false figures and cannot be considered sufficiently accurate.

SUMMARY

Of these two new methods for rubber analysis the first gives the correct value for free or elementary sulphur in rubber goods, and the second a lower and more accurate value for the coefficient of vulcanization than can be obtained by any of the older methods. This work was all done on pure gum stock without any accelerator, and the methods developed are now being expanded to meet the conditions which obtain in compounded stocks.

TIRE PRICES REDUCED

As their contribution toward the price adjustments being made in most industries throughout the country, in order to stabilize business and restore normal living conditions, several leading American tire companies have announced sweeping reductions which put prices back where they were before the general price advance in March went into effect. Other companies are expected to take a similar course.

These price reductions were not unexpected, as it had been no secret for some time that the process of liquidating inventories had proved slow and that cancellations of orders and a decline of new business had found some manufacturers with rather heavy stocks on hand. Evidence of this condition has been seen in the gradual increase in unemployment in Akron and other rubber centers attendant upon the curtailment of operations by tire companies.

Last spring price advances of 15 to 20 per cent were made and dealers stocked up heavily in advance. Sales fell off greatly during the summer, however, due partly to the wave of economy and retrenchment which has swept the country and the resulting general depression in the motor trades; partly to the declining raw material market, and partly to the fact that cord tires are giving a surprisingly long mileage.

Instead of attempting to maintain a high level of prices until the high cost tires on hand are moved, leading tire manufacturers are meeting the general decline in the raw material market with a reduction in prices to stimulate trade, thus giving consumers the benefit of the reduction during the autumn riding season when many replacements are usually required and preparations are made for winter driving.

Since last spring the two principal commodities entering into tire manufacture have dropped off sharply in price, and these are important factors in the price reductions announced. Crude rubber, which a few months ago was selling at 50 cents per pound, is now quoted at less than 18 cents, the lowest price in history. Cotton has dropped from 40 cents to 20 cents a pound, and fabrics which were selling at $2.80 per pound early in the year are now quoted at $1.85. Labor costs alone are still at their highest figure.

Following the lead of the Ford Motor Co. in reducing car prices to meet the consumer demand, the Lee Tire & Rubber Co. with commendable foresight led the way in tire price reductions. Effective October 1, reductions of 15 to 20 per cent were made on its entire line of fabric, cord, puncture-proof fabric and puncture-proof cord tires. Although raw material costs on that date did not fully justify these reductions, officials of the company were convinced that future costs of materials would be certain to justify them. The new prices represent a considerable sacrifice of profits, but it was felt that the company in shouldering this loss was taking a big and necessary step toward the restoration of general conditions to a pre-war basis.

The United States Rubber Co., with no forward purchases of crude rubber and favorably situated with respect to fabric supplies, was quick to meet the trend of the times toward lower levels, and effective November 1 announced a reduction of 15 per cent on inner tubes; 12½ per cent on Ford size fabric tires; 10 per cent on all other fabric tires and solid truck tires. Also, a slightly smaller reduction on Royal Cords.

The Mason Tire & Rubber Co., has published price reductions up to 12½ per cent effective November 1 on all its production, including fabric, junior cord and regular cord tires and tubes for passenger automobiles, and pneumatic, solid and cushion truck tires. Ownership and operation of its own tire fabric spinning and weaving mills, which produce its entire supply of cord fabrics, is a big factor in this company's ability to reduce prices at this time.

Price reductions by The B. F. Goodrich Co., effective November 1, range from 9 to 15 per cent and average 12 to 13 per cent.

The new list of the Ajax Rubber Co. shows reductions running from 10 to 15 per cent on all grades and types.

The Fisk Rubber Co. reductions, effective November 1, were 10 to 15 per cent on all cord and fabric tires except Ford sizes, which were slightly advanced.

Effective November 15, The Goodyear Tire & Rubber Co. reduced its prices 7½ per cent on All-Weather tread cord casings and 14 per cent on fabric casings. The prices of inner tubes remain unchanged.

The Miller Rubber Co. reductions, effective November 15, are 5 per cent on heavy duty tires; 7 per cent on cords; 12½ per cent on Ford sizes, and 10 per cent on all others.

The Pennsylvania Rubber Co. reductions, effective November 15, are 10 per cent on fabrics, 7 per cent on cords.

The Firestone Tire & Rubber Co. has announced reduced prices on its line of fabric tires only, the manufacture of which has been discontinued by the company.

It is believed that these price reductions will induce many motorists who had thought to put their cars into winter storage, because new tires were needed, to reequip and keep them in commission for the winter. Winter motoring affords many pleasures and advantages, and with the numerous devices on the market for comfort and safety has become increasingly popular in recent years. Indications are that the winter will be a mild one, and extensive preparations are everywhere being made to keep the main roads open to traffic throughout the season.

Tire company officials are optimistic and believe the bottom of the slump has been reached. They report a steady movement of surplus tire stocks from the warerooms of dealers throughout the country, but do not anticipate a return to normal production for some months yet. Several plants were closed a week for inventory taking and most of them are operating with a curtailed force or on a part-time basis.

Tire price reductions are beginning to be reflected in other lines of rubber goods, The Goodyear Tire & Rubber Co. and the Manhattan Rubber Manufacturing Co. having cut prices on certain lines of mechanical rubber goods 10 per cent. It is believed that reduced prices may be named on all lines of mechanical rubber products owing to the liquidating pressure in certain quarters of the industry.

New Machines and Appliances

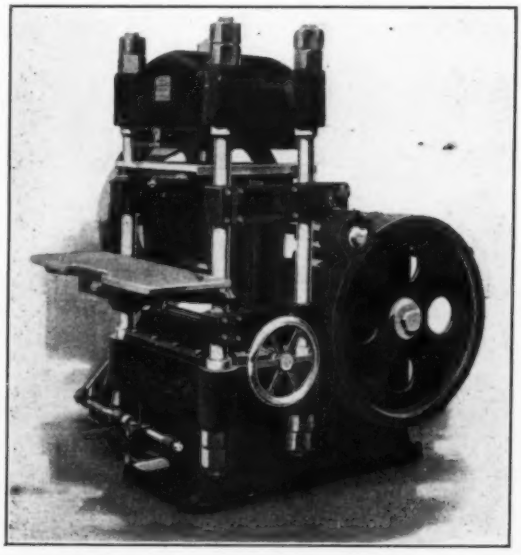
SAFETY DEVICE FOR TOGGLE PRESSES

TOGGLE PRESSES used for making small rubber molded articles are continuous running machines, and operate at a certain number of cycles per hour. A definite time is allowed during each cycle for changing the molds before the platen of the press starts upward. Occasionally an operator does not remove his hand from the platen soon enough, resulting in a severe injury when the platen moves toward the upper head of the press.

That these conditions can be overcome has been successfully demonstrated by a prominent rubber company who installed the safety device shown in the diagram on all their toggle presses. Production is now limited only by the speed of the operator.

To eliminate the personal hazard, a magnetic clutch is installed on the driving shaft. One member of the clutch drives the press through a pinion and is bushed on the main driving shaft to which is keyed the other clutch member. Upon disengaging the clutch while the press is operating, the platen comes to rest almost instantly, making it unnecessary to stop the motor and flywheel.

Connected in each circuit to the clutch are two push button switches and a limit switch of the rotating cam type, the latter



SEYBOLD TOGGLE PRESS

being directly connected to the driven member of the press and makes a complete cycle for each cycle of the press. The push buttons are mounted on the front of the press, convenient to the operator.

To start the press, the operator puts his hands on the push buttons for a moment or so. This keeps his hands out of danger and at the same time starts the clutch, the circuit for which is maintained by the limit clutch.

The platen completes the upward stroke. As soon as it starts downward the operator removes the mold and inserts another. If his work is completed before the platen starts on the upward stroke he depresses both push buttons for an instant, until the switch has time to maintain again the circuit for the clutch. However, should he fail to complete his work before the platen starts the upward stroke, the limit switch automatically releases the clutch and consequently stops the press. In case he fails to keep up with the press, it automatically stops. There is no possibility of the operator becoming caught in the press. Upon fail-

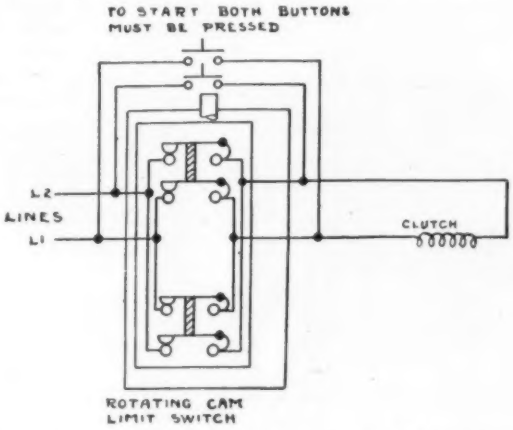


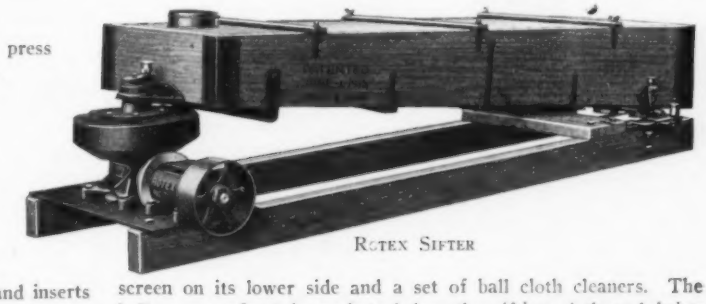
DIAGRAM OF CONNECTIONS BETWEEN PUSH BUTTONS, LIMIT SWITCH AND CLUTCH

ure of power, it also automatically stops and it can be started only by pressing both push buttons.—Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin.

MACHINE FOR SIFTING COMPOUNDING MATERIALS

Sifting machines have demonstrated their utility in removing trash, specks, or foreign matter from materials used in compounding, thereby insuring uniformity in the sifted product. The Rotex sifter here shown is unique in that it operates with a level rotary sieve motion and includes a patented ball cloth cleaning device, making it particularly efficient in sifting fine, soft or sticky materials.

The sieve box is made light in weight to avoid excessive vibration and strongly braced to withstand the driving strains. The sieve motion is level and rotary at the head end, elliptical in the center and reciprocating at the extreme tail end. The sieves and also the dust cover frame which holds them in place are readily removed, making the sifter box accessible for cleaning or changing sieves of different mesh. Each sieve consists of a frame having a sieve cloth on its upper side, a ball supporting



ROTEX SIFTER

screen on its lower side and a set of ball cloth cleaners. The balls are confined in pockets below the sifting cloth and being deflected upward by beveled divisions they strike the sieve cloths very lightly but frequently, thereby cleaning the cloths without wearing them.

These machines are made in several sizes and capable of making the necessary number of separations in handling a wide range

of materials. Not over ½-h.p. is required to operate the largest machine while the smallest designed for laboratory work requires only ¼-h.p.—The J. H. Day Co., Cincinnati, Ohio.

GRINDING MILL FOR RUBBER MANUFACTURERS

This grinder should be of interest to any one who has to grind hard rubber dust, asbestos, scrap leather, and fabric used in making composition soles. Its usefulness is, of course, not confined to these items alone, as it can be used for grinding a wide range of compounding ingredients. The chief feature of construction is the horizontally placed grinding surface, which causes the material to work gradually and evenly outward from the center into the annular chamber which encircles the grinding plates. This chamber terminates in a rectangular mouth-piece near the top of the machine, whence the material is carried into the receiving bin.

"KEK" UNIVERSAL GRINDING MILL

The mill is cylindrically shaped with the hopper or feed inlet in the center of the top plate. The grinding medium consists of two taper-disked steel plates fitted with steel pins. The top plate is a fixture bolted down to the body of the machine, but the lower plate rotates by means of a worm spindle driven by a worm wheel connected with the shaft. A combination gear, enveloped and locked up in an oil bath, gives the necessary high speed for fine grinding.—Chemical Engineering Co., Limited, Manchester, England. United States agents, J. P. Devine Co., Buffalo, New York.

TIRE ROUGHING AND BUFFING MACHINE

This machine has demonstrated its usefulness not only in tire factories, but also in the retreading and the repairing of tires. It is simple in design, ruggedly constructed for hard service, and to meet the requirements of the largest pneumatic tires.


TIRE BUFFER

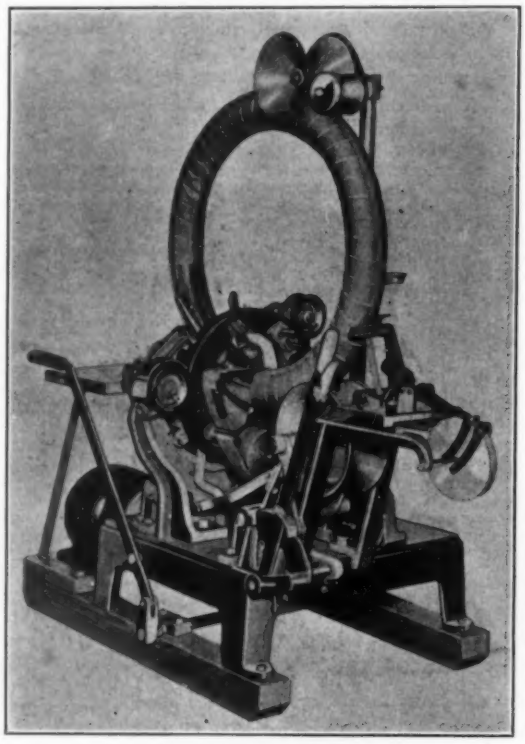
The spindles are of one-piece construction and are made from high-grade steel. All the wheels are fitted directly on the spindles, which withstand all working loads and pressures without being thrown out of alinement. The bearings are completely enclosed from dust and grit, and they are provided with heavy felt protector washers on each side of the bearing housing. Every machine is fitted with a quick-acting switch. The operating handle is conveniently located in front of the motor, with the switch enclosed in the base. This insures the best possible protection and permits ready access to the switch mechanism by simply removing the cover plate. The motor parts need not be disturbed. The motor is arranged either for direct or alternating current. The machine in the illustation is supplied with a rasp for coarse work, and a buffing wheel. Heavy felt, leather or grinding wheels may also be easily fitted on the spindles. Two men can work at the machine at the same time, and as it is equipped with an automatic starter, an inexperienced workman can operate it without any trouble.—Hisey-Wolf Machine Co., Cincinnati, Ohio.

THE NEW PIERCE TIRE WRAPPING MACHINE

The new Pierce machine for wrapping finished tires with Kraft or string-inserted paper in 2¾-inch widths, instead of the customary 1½ inch, results in a saving of about 15 per cent on material.

A notable improvement in this machine is the bead-closing device which permits wrapping the tire when the beads are drawn closely together, thus saving material and effecting a tight, permanent wrapping. Another new feature is the location of the control lever which is so placed that one operation disconnects the power, applies the brake and opens and holds the bead-closing device until the wrapped tire has been removed and another substituted.

The edge folder has also been improved and an open back type provided which is much more readily threaded than the old one. The adjusting lever at the right of the operator permits instant adjustment for any sized tire between a 2½ by 28 to a 6 by 36.


PAPER WRAPPING MACHINE

The taping attachment applies a strip of gummed tape to the wrapping as it is being done, holding the layers together and preventing unwinding if one should break. The shuttle revolves between leather-faced pulleys which firmly support it and permit of a high speed.

This machine will wrap a tire of average size in eight seconds, and in every day use handles about 1,800 tires per day. It is driven by a motor directly connected, operating through a rawhide pinion, and with very little noise or vibration.—Pierce Wrapping Machine Co., 617 Jackson Boulevard, Chicago, Illinois.

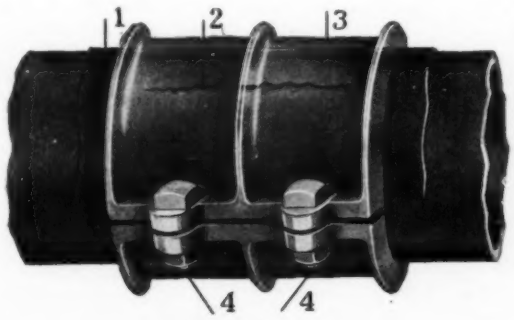
YARWAY HOLTITE PIPE CLAMP

Leaky joints and splits are common faults to all pipe lines. The loss incurred through them often runs up into big figures,

particularly when it is necessary to shut down an entire section of pipe lines for repairs.

The pipe clamp shown in the accompanying illustration is used to stop all holes and splits, in pipes. It is used either temporarily until the pipe can conveniently be replaced, or permanently.

The clamp is simple to attach. First the packing 1 is laid over the split or hole 2. Then the clamp 3 is fitted over the packing and

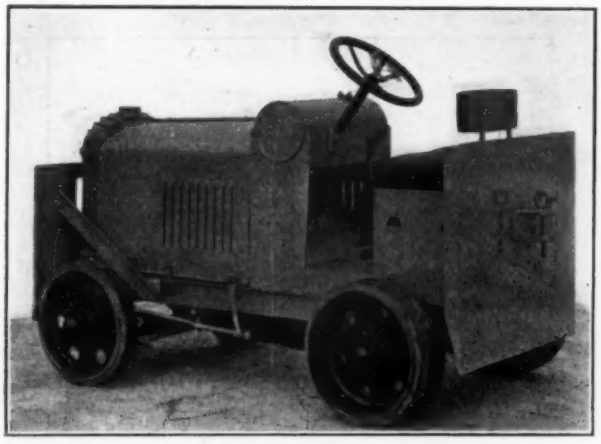


A NOVEL PIPE CLAMP

tightened by bolts 4. The clamp should never be used on pipes while under high pressure.—Yarnall-Waring Co., Philadelphia, Pennsylvania.

GASOLINE OPERATED TRACTOR FOR RUBBER FACTORIES

A new development in industrial haulage equipment is a tractor operated by a gasoline engine, instead of electric motor



GASOLINE INDUSTRIAL TRACTOR

and storage batteries. It is a specially designed all steel machine, built to withstand hard use and abuse. It is claimed to have sufficient capacity to move freight cars and still operate economically on small loads, thus offering a wide diversity of usefulness.

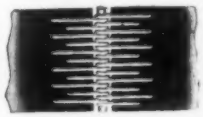
The motor is four-cylinder, four-cycle, rating 22.5 h. p., capable of delivering 40 h. p. at 2,000 r. p. m. The tractor is supplied with a battery type ignition with spark lever control at the steering column, six-volt starting motor, 1½-inch carbureter with dash choke control for easy starting, and a nine-gallon gasoline tank amidships at the cowl. The gasoline is fed by gravity to the carbureter. The tires are solid rubber.

Under average conditions the trailing load is from 10 to 15 tons, although in exceptional cases the motor can be utilized for spotting loaded freight cars.—The Towmotor Co., Cleveland, Ohio.

MACHINE FOR LACING BELTS

This is a small portable machine weighing 24 pounds which can be carried to the broken or stretched belt, enabling the operator to relace the belt without removing it from the shaft. It is made of steel and all parts are practically unbreakable.

A square belt end is inserted into the slotted opening and, by working the



A "CLIPPER" JOINT

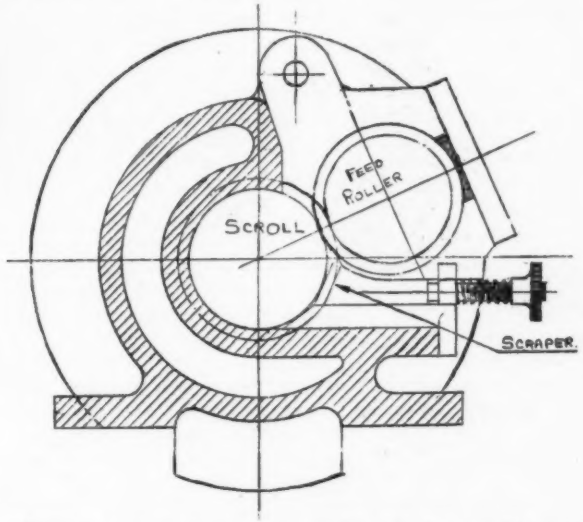
"CLIPPER" BELT LACER

levers, the hooks are pressed into it and left flush with the surface of the belt. These hooks come on cards and are easily placed in position by throwing back the center and side heads which hold the clinch bar. The hooks are pressed into both ends of the belt. Then they are interlocked and joined together with rawhide or a pin. In taking up a stretch, the necessary length is cut off, the hooks pressed in, and the two ends joined together. The loss of time for the entire operation is not supposed to be more than 3 minutes.

The machine is claimed to handle wider belts than 6 inches, by simply repeating the operation. On narrow belts, the card of hooks is cut to the required length.—Clipper Belt Lacer Co., Grand Rapids, Michigan.

SINGLE ROLLER FEED FORCING MACHINE

Roller feeding of rubber stock to tubing or forcing machines has not been developed in American rubber manufacturing practice, although it has met with favor abroad, especially in British factories. The usual form has embodied the use of two rollers placed over the stock feed opening of the tuber. This has always been a source of considerable trouble, which has now been entirely eliminated in the newest design, a cross-section of which is shown in the illustration.



SECTION OF SINGLE ROLLER FEED FOR SIMPLEX FORCING MACHINE

The material being fed is placed between the single feed roller and the "scroll," by which is meant the stock screw of the tuber.

The rubber is thus forced into the recesses of the scroll with a constant and positive feed and is prevented from encircling the feed roller by the action of a scraper located adjustably as a part of the device.

The feed roller revolves in contact with the scroll and is driven from the scroll shaft through machine cut spur gearing. Tubers with this type of roller feed are the special design and product of Francis Shaw & Co., Limited, Manchester, England.

DOGWOOD DIE BLOCKS FOR RUBBER FACTORIES

Wooden blocks are largely used in the manufacturing of rubber goods where the material is cut by means of knives or dies, such as in footwear, rubber sole and heel, and rubber mat factories. These blocks are usually of maple, although lately fiber blocks have been substituted with good results. Better than either, so the maker claims, is a block made of dogwood (*Cornus Florida*), selected from the finest growths of Texas or Virginia. A dogwood block is much harder than one of maple, closer-grained and has less tendency to warp. It has no grit to dull the die, and does not break up into sawdust as does maple. Its lasting qualities are more marked, as only ⅛-inch is planed from a dogwood block as against ¼ inch from a maple block. Its use enables a workman who cuts by hand to do with a three-pound mallet the same work that formerly required a ten-pound mallet. After competition tests with fiber cutting blocks in one of the mills of a large rubber company, the dogwood block was given preference, the price of the two blocks being about the same.—Shambow Shuttle Company, Woonsocket, Rhode Island.

MACHINERY PATENTS

PNEUMATIC TIRE REMOVING APPARATUS

This is a machine designed to remove heavy pneumatic truck tires without injury to the rim, and to replace the slow manual methods heretofore used. Referring to Fig. 1, the upper drawing is a sectional elevation with a tire in position on the machine, while the lower is a plan view.

The tire *B* is placed on top of the annular expansion chamber *A*. The arms of the spider *C* are rested on the upper edge of the rigid metal tire rim. Then the spider is secured in position by screwing down the nut on the bolt which extends from the table top upward through the spider hub.

Compressed air is admitted into the inner tube of the expansion chamber *A* through a nipple attached to a branch of the tube, which extends down below the table. The gradual inflation of the tube causes the expansion chamber *A* to expand, and in turn raise the tire upward until it slides up over the outer face of the rim. A relatively low air pressure in the tube inside the expansion chamber is sufficient to exert a large force on the tire.—Noah L. Caldwell, Knoxville, Tennessee. United States patent No. 1,352,722.

VULCANIZING RUBBER TIRES BY ELECTRICITY

The object of this invention is to use electricity instead of steam as the medium of vulcanizing rubber tires, in a simple, economical and efficient manner.

The apparatus shown in plan and elevation in Fig. 2 consists of a tire mold, preferably of metal and formed in halves, which are fastened together by bolts. The rubber tire on its core is placed in the mold. The casing thus made up forms a continuous metal ring shown at *A*. This ring becomes a single turn secondary coil of a transformer, the primary coil of which is *B* and the transformer core *C*. This is made up in the usual manner of laminated sheet iron, and it is comprised of two parts, which are readily separated, as indicated by the dotted lines, allowing the tire mold to be easily removed. The primary coil *B* of the transformer may be divided into any desired number of sections with leads, *D* to allow a wide range of heat control.

The tire mold is made up and inserted into the core of the transformer, which is then closed to its normal position. Current is supplied to the primary coil of the transformer, and a current of low voltage, but relatively high in amperes is induced into the tire mold. Due to the resistance offered to the flow of current, by the metal, the mold quickly becomes heated and the tire is vulcanized. The intensity of the heat is easily controlled by the number and the mode of connections of the sections of the primary coil.—Joseph Ledwinka, assignor to Edward G. Budd Manufacturing Co., both of Philadelphia, Pennsylvania. United States patent No. 1,348,228.

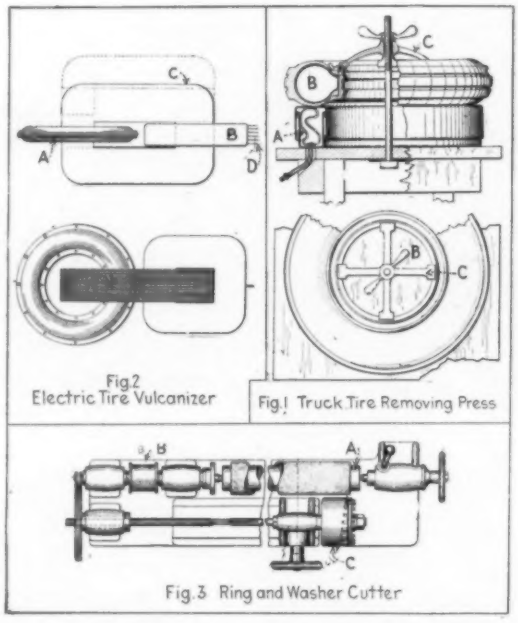
MACHINE FOR CUTTING RINGS AND WASHERS FROM TUBING

This improved device for cutting rubber packing rings or washers from tubing, works satisfactorily upon thick material necessary to produce wide rings.

Referring to Fig. 3, which shows a plan of the machine, the tubing is placed on a mandrel *A*, which is held between centers and driven by the belt pulley *B*.

The cutter head *C* has a number of spaced knives, and it is mounted on a shaft with a spur gear at one end, which meshes with a smaller gear at the end of the shaft supporting the mandrel. Each blade on the cutter head is spaced from the preceding blade a distance corresponding to the desired thickness of the packing rings. The blades project sufficiently to cut completely through the rubber tubing, the knives acting successively, due to the fact that the mandrel rotates faster than the cutter head.

Where long tubing is used, the cutter head may be intermittently moved after the cutting of one set of rings. This is done by leaving a gap in the knives, so that the knives are all out of

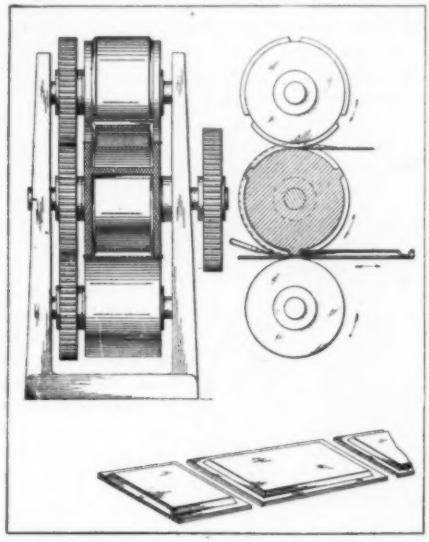


contact with the rubber tubing until the shifting of the cutter head is completed.—Joseph E. Perrault, assignor to Hood Rubber Co., both of Watertown, Massachusetts. United States patent No. 1,348,316.

PRODUCING A HOLLOW RUBBER BISCUIT

This invention covers the process and apparatus for producing an inflated rubber article known as a biscuit, from which bulbs, toys and similar blown goods may be made.

A special calender is employed by means of which a sheet of calendered stock is formed with successive depressions along its length, the shape of which depressions is varied according to the character of the finished article. This sheet of stock is then superimposed upon a flat sheet and two sheets are joined by



CALENDER FOR MAKING BLOWN GOODS

pressure around the margins of the depressions formed in the upper sheet, compressed air or other gas being at the same time injected into the space formed by the depressions, in order to prevent adhesion of the sheets at the point where the biscuit is to be formed.

The design of calender and its mode of operation are clearly indicated in the accompanying illustrations.—Henry Z. Cobb, New York City, assignor to the Mechanical Rubber Co., of New Jersey. United States patent No. 1,349,560.

OTHER MACHINERY PATENTS

THE UNITED STATES

NO. 1,353,933 Apparatus for laying or forming tire treads. H. I. Morris, assignor by direct and mesne assignments to Morris Tire Machinery Co.—both of Los Angeles, Cal.

1,353,934 Apparatus and method for making rubber elements for tires, laminated tire treads, etc. H. I. Morris, assignor by direct and mesne assignments to Morris Tire Machinery Co.—both of Los Angeles, Cal.

1,354,227 Tire mold. A. R. Thompson, Tacoma, Wash.

1,354,371 Apparatus and method for wrapping tires, etc. E. H. Angier, Framingham, Mass.

1,354,425 Apparatus for applying radial pressure to tires during vulcanization. T. Sloper, Devizes, England.

1,354,452 Mixing machine for rubber, etc. D. R. Bowen and C. F. Schnuck, assignors to Farrel Foundry & Machine Co.—both of Ansonia, Conn.

1,354,459 Expansible core for tires. C. G. A. Bäckdahl, Stockholm, Sweden, assignor to United States Tire Co., New York City.

1,354,463 Slitting and rewinding machine. J. A. Cameron and G. B. Birch, assignors to Cameron Machine Co.—all of Brooklyn, N. Y.

1,354,464 Slitting and rewinding machine. J. A. Cameron and G. B. Birch, assignors to Cameron Machine Co.—all of Brooklyn, N. Y.

1,354,595 Tire rebuilding device. E. Borman, Chicago, Ill.

1,354,754 Pressure clamp for vulcanizing apparatus. S. B. Huey, deceased, by F. C. Burkhalter, administrator—both of Wichita, Kans.

1,354,849 Tire-tread puller. J. Schmidt, Tracy, Cal.

1,355,104 Slitting and rewinding device. J. A. Cameron and G. B. Birch, assignors to Cameron Machine Co.—all of Brooklyn, N. Y. (Original application divided.)

1,355,106 Winding mechanism. R. McC. Johnstone, Roselle Park, N. J., assignor to Cameron Machine Co., Brooklyn, N. Y.

1,355,107 Winding mechanism to nullify transverse wrinkles in a web. R. McC. Johnstone, Roselle Park, N. J., assignor to Cameron Machine Co., Brooklyn, N. Y.

1,355,278 Apparatus for inserting bristles in rubber pads. W. T. Sherman, Troy, assignor to Henry T. Hughes Co., Inc., New York City—both in New York. (Original application divided.)

1,355,305 Rubber mixing machine. D. R. Bowen and C. F. Schnuck, assignors to Farrel Foundry & Machine Co.—all of Ansonia, Conn.

1,355,335 Pulverizer. W. Hasendahl, San Francisco, Cal., assignor to Allis-Chalmers Manufacturing Co., Milwaukee, Wis.

1,355,518 Textile disintegrating machine. F. von Osten, assignor of ½ to C. Schueler—both of East Orange, N. J.

1,355,525 Apparatus and method for producing cord tire carcass material in strip form. E. K. Baker, Chicago, Ill.

1,355,734 Apparatus for manufacturing solid band tires. F. Cole, Leyland, England.

1,355,885 Rubber mixing machine. D. R. Bowen and C. F. Schnuck, assignors to Farrel Foundry & Machine Co.—all of Ansonia, Conn.

1,356,173 Air bag for inner tubes. C. L. Smith and E. S. Webster, assignors.

1,356,485 Machine for cutting bias strips from tubular fabric. A. C. Bunker, Montclair, N. J.

1,356,596 Separable sectional tire core. J. W. Brundage, assignor to The Miller Rubber Co.—both of Akron, O.

1,356,597 Retreading vulcanizer. C. T. Byerley, Kansas City, Mo.

1,356,691 Rubber mixing machine. D. R. Bowen and C. F. Schnuck, assignors to Farrel Foundry & Machine Co.—all of Ansonia, Conn.

1,356,721 Collapsible tire core. F. L. Johnson, Akron, O.

1,356,891 Apparatus for manufacturing solid tires. W. J. Steinle, Elmhurst Heights, N. Y., assignor to Morgan & Wright, Detroit, Mich.

THE DOMINION OF CANADA

204,187 Apparatus and process for recovering solvent. E. I. du Pont de Nemours & Co., assignee of T. Baker—both of Wilmington, Del., U. S. A.

204,710 Repair vulcanizing device. W. Oppenheimer, Brawley, Calif., U. S. A.

204,759 Tire-building machine. The Goodyear Tire & Rubber Co., Akron, O., assignee of W. C. Tyler, Racine, Wis.—both in U. S. A.

204,896 Tire repair vulcanizer. C. Nordstrom, Milwaukee, Wis., U. S. A.

204,924 Battery-jar forming machine. J. H. Wagenhorst, Jackson, Mich, U. S. A.

204,952 Collapsible tire core. H. A. Denmire and The General Tire & Rubber Co., assignee of ½ interest—both of Akron, Ohio, U. S. A.

205,052 Expansible core for vulcanizing tires. C. Holm, Bowman, North Dakota, U. S. A.

205,139 Apparatus for cutting blanks. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of W. Kent, New York City, U. S. A.

205,147 Machine for forming articles of fabric and rubber. Firestone Tire & Rubber Co., assignee of H. F. Maranville—both of Akron, Ohio, U. S. A.

THE UNITED KINGDOM

146,621 Press for molding rubber, etc. A. Roberts & Sons, Lancaster, and F. J. and A. E. Charles, 73 Great Lister street, Birmingham.

147,164 Apparatus for trimming strip of uniform width from selvedges of fabrics. The Goodyear Tire & Rubber Co., 1144 East Market street, Akron, assignee of A. P. Lewis, 347 College street, Wadsworth—both in Ohio, U. S. A. (Not yet accepted.)

147,248 Repair vulcanizer for tire treads. H. K. Wheelock, F. A. Weller, and W. R. Fontaine, 1730 South Los Angeles street, Los Angeles, Cal., U. S. A.

GERMANY

PATENTS ISSUED, WITH DATE OF ISSUE

328,292 (April 1, 1919.) Appliance for the reclamation of solvents for the manufacture of rubber goods. Paul Francke, 29 Funkenburgstrasse, Leipzig.

328,545 (November 6, 1915.) Apparatus for the preparation of rubber footwear for vulcanization. Boston Rubber Shoe Co., Malden, Mass., U. S. A.

329,255 (December 14, 1919.) Tube catch for rubber-ring cutting machine. Karl Koehler, 14 Kollenrodtstrasse, Hannover.

PROCESS PATENTS

THE UNITED STATES

NO. 1,354,174 Manufacture of inner tubes. H. Dech, assignor to Mercer Tire Co.—both of Trenton, N. J.

1,354,992 Retreading rubber tires and finished product. E. Nestler, Bergenfield, N. J.

1,355,206 Manufacture of hollow articles of rubber by molding on fusible core. H. A. Woofter, Swampscott, assignor to Thomson Electric Welding Co., Lynn—both in Mass.

1,355,265 Manufacture of composite unwoven cord fabric. R. B. Respess, New York City.

1,355,534 Manufacture of composite rubber and fiber fabric. E. G. Buchmann, Chicago, Ill.

THE DOMINION OF CANADA

204,185 Recovering solvent. E. I. du Pont de Nemours & Co., assignee of T. Baker—both of Wilmington, Del., U. S. A.

204,186 Recovering solvent. E. I. du Pont de Nemours & Co., assignee of T. Baker—both of Wilmington, Del., U. S. A.

204,320 Repairing pneumatic inner tubes, etc., with sheet and raw rubber cemented and vulcanized over break. T. A. McAllister, Augusta, Ga.

204,329 Manufacturing fillers for rubber or paint from precipitate obtained by clarifying the juice in sugar manufacture by means of evaporation. W. B. Rosevear, Jr., Detroit, Mich., U. S. A.

204,585 Manufacturing tire treads from hot vulcanizable plastic rubber and rapidly cooling to reduce shrinkage. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of J. J. Shea, Hartford, Conn., U. S. A.

204,679 Manufacturing belting of diagonal strips of rubberized woven fabric. C. G. Gates, Denver, Colo., U. S. A.

204,767 Manufacturing inner tube with fabric band cured on inner side, having flaps at edges. The Premier Tire & Rubber Co., Limited, assignee of R. E. Wright and H. T. Pyke, all of Hamilton, Ont., each an assignee of a half interest of C. F. Fisk, Trenton, N. J., U. S. A.

204,842 Producing tire patch materials of rubberized fabric. C. O. Duffy, Dallas, Tex., U. S. A.

204,945 Manufacture of rubber footwear. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of J. M. Rice, F. A. Joseph, and A. D. Rupp, coinventors, all of New Haven, Conn., U. S. A.

New Goods and Specialties

VENTRILOQUIAL HEAD WITH RUBBER FACE

A VENTRILOQUIAL HEAD that gives a most novel and lifelike effect secured by the use of rubber for the face has been invented by an Englishman. The accompanying illustration shows a reproduction of two of these heads compared with the natural one of the inventor himself. The absence of all joints or lines around the mouth and jaw permits a natural expansion of the lips and cheeks which is said to be uncanny in its very lifelikeness. The advantages claimed for this head are as follows: In place of the usual strap or handle, with strings to operate the movements and springs to make them return, the operator's hand enters the head and the fingers bear directly on the mechanism, thus having absolute control of each part. The index finger operates the eyes, and can make them look in every direction. The second and strongest finger operates the lower jaw movement, which is always active. The third finger is used for manipulating the upper lip for singing or sneering. The wrist is employed in the neck, giving a natural nodding or shaking motion. The device has been patented in Great Britain and the United States. —The Norton-Bretna Manufacturing Co., 18-19 Craven street, Charing Cross, London, England; F. A. Ellis, inventor; American patentee and agent, Walter J. Ellis, 140 West 38th street, New York City.

THE ELLIS VENTRILOQUIAL HEAD AND ITS INVENTOR

SODERLING "DUSTITE" RESPIRATOR

THE "DUSTITE" RESPIRATOR

The accompanying illustrations indicate how the Soderling "Dustite" respirator is worn and the appearance of the respirator itself. This is made of rubber so shaped as to conform to the contour of the nose and face, while an aluminum rim holds in place the filter which is renewable.

This is said to be one of the best for use in the industries where any kind of dust is present, and for spraying paint and other mixtures. It does not interfere with vision, is comfortable, and permits breathing through a dry filter, having no sponge or pad requiring wetting or washing. This is said to be the only respirator approved by the Underwriters' Laboratories, and is protected by the Walter Soderling patent recently sold to the present manufacturer.—Willson Goggles, Inc., Reading, Pennsylvania.

"DUSTITE" RESPIRATOR IN USE

RUBBER FEET PREVENT MARRING

Among the various uses for rubber, that which employs it in the form of small pads or feet applied on the bottom of comparatively heavy articles to prevent marring polished surfaces, finds a new application every little while. The good-looking bread-board made of hardwood, either in the natural finish or polished, with "Ivory Pyralin" rim and cutting frame of nickel, is one example. —Home Helps Manufacturing Corporation, 39 West 38th street, New York City.

Another instance is in the case of an electric motor for running an ordinary sewing machine. Here the rubber is applied in the form of bumpers in the base. With other attachments made to use with this motor, it can be utilized as a knife grinder, a silver polisher, a cream or egg whipper, or to operate a small electric fan. —Hamilton-Beach Manufacturing Co., Racine, Wisconsin; representative, John Jorgensen, 114 Liberty street, New York City.

TAYLOR TENNIS BALL

A REINFLATABLE TENNIS BALL

The newest novelty in tennis balls is, perhaps, the one shown here. It is a reinflatable one, the point at which inflation is to be made being indicated by an indelible spot on the ball. Of great endurance and resiliency, bounding true and fair, this ball is constructed with an inner ball of rubber to which an inside knob of soft rubber is attached. Through this the needle of the inflating device is inserted before the felt cover is adjusted at the factory; afterward the black dot on the ball indicates where this spot is and where the needle of the "reflator" is to be applied when necessary. The ball is inflated until it feels sufficiently hard, then the needle is withdrawn and the reinflation is complete. As an extra precaution, the punctured spot may be pressed together with pliers, to make the seal doubly safe.

The inflating device, called a "reflator," is pictured in the lower corner of this page, in two sizes. The No. 1 is for individual use and has a 5½-inch pump, a detachable needle, and an extra needle. The No. 2 has a 10-inch pump, is intended for club use, and has both a detachable needle and detachable handle. An extra needle is included with this, also.—Alex Taylor & Co., Inc., 26 East 42nd street, New York.

No 2 No 1

"TENNIS-BALL REFLATOR"

"SUPERFIX" RUBBER MEND

A rubber repair material called "Superfix" is being marketed which, it is claimed, will repair glass cuts, skin cuts, holes, sand blisters, etc., in tires, as well as punctures, rips, tears, and blowouts. It is also used for mending hot-water bags, rubber boots, gloves, hose and other kinds of rubber articles. One canful makes 100 small repairs, no vulcanizing being required.—The Superfix Rubber Co., Elyria, Ohio.

A CLEAR-VOICE TELEPHONE ATTACHMENT

A new telephone mouth-piece of hard rubber allows the voice to sound natural, it is claimed, and prevents the speaker being overheard. Excess vibration is provided an outlet through small holes at regular intervals drilled through from the end next the telephone to the shoulder just above the screw-thread, as indicated in the picture. A crystal bead hung on a monel metal bar and shown here in the cut-out, breaks up the sound waves and also prevents foreign articles such as pencils from being poked into the mouth-piece. A shoulder for a muffler plate is also provided.—The Evolution Phone Co., Inc., 48 Greenwich avenue, New York City.

PAPE "THERAPHONE"

RUBBER DRESS ACCESSORIES

Of the two novelties shown here, the dress shields, which have a connecting strap of shirred fabric across the back, derive their name, "Shirlastic," from this feature, which is patented. A double strip of muslin attached to the back edges of the shields forms a casing for the insertion of narrow elastic webbing or cords. These shir the strip when not under tension and provide means to prevent the shields from slipping away from position. There are also shoulder straps of elastic and similar ones over the arms, while shaped sections of net, fastened by tying, form a brassiere effect at the front.

"SHIRLASTIC" DRESS SHIELD

ORNAMENTAL RUBBER BEACH BAG

"Shirlastic" ribbon, a shirred ribbon-covered elastic, is also to be marketed by the same manufacturer. It is to be used for garters, baby carriage straps, camisole trimmings, boudoir caps, etc., and may be had in different widths, in both plain and fancy patterns.

The tasseled beach bag, made of pure rubber, has an attractive design in colors printed on the outside. It is of good shape and roomy, in graceful pattern, and the opening is easily gathered up with drawstrings.—I. B. Kleinert Rubber Co., 719 Broadway, New York City.

"VELVET" PLUG HEEL

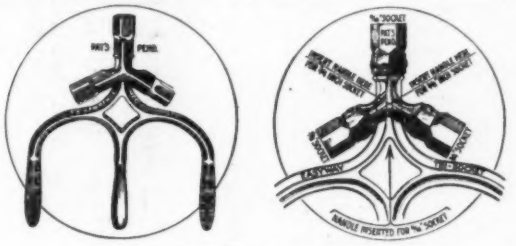
A STEP TOWARD SAFETY

Rubber heels have come into such general use that the question is not, "Do you wear rubber heels?" but rather, "Do you prefer rubber half-heels or whole-heels?" Many persons use whole-heels on outing shoes and half-heels on more dressy footwear. Made for all tastes is the "Velvet Neverslip Friction Plug" rubber heel, which comes in many sizes, both whole style and half style, with or without the inserted friction plug, said to prevent slipping. These heels show very careful workmanship, both in molding and finishing, and have not the objectionable clumsy appearance of low-grade heels.—Frank W. Whitcher Co., Boston, Massachusetts.

A TIME AND TEMPER SAVER

A handy tool commendable to the motorist for its simple working principle is the "Easy-Way" wrench, which has two handles for gripping and starting the nut and a central one to continue the twirling motion until the nut comes off. Handles are of highest grade malleable steel and the entire tool is handsomely finished in black rubber enamel. A later development is the "Easy-Way Tri-Socket" wrench, to fit practically all makes of demountable rims. It combines in one tool sockets for 5/8-, 11/16- and 3/4-inch nuts. The handle can be conveniently adjusted to use whichever socket is required.—F. K. Lawrence Manufacturing Co., 615 First National Bank Building, Chicago, Illinois.

"EASY-WAY" WRENCH



"EASY-WAY TRI-SOCKET" WRENCH

THE "NATIONAL AIRLESS" TIRE

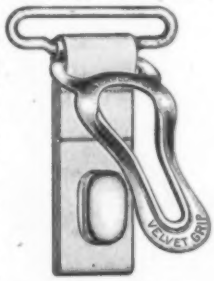
A tire having the general appearance of the ordinary pneumatic, yet differing essentially from it inasmuch as it does not require inflation, is the "National Airless," being manufactured by a company in Los Angeles. The tire uses neither inner tube nor compressed air, but contains instead a bridgework of rubber piers and ribs inside a casing and vulcanized into one piece, the whole designed to give resilience without the risks of punctures or blow-outs. It is the intention of the company, which has already a large number of these tires in operation in the Southwest, to set up a large factory soon in the south end of the city. Application has been made for a patent.—National Airless Tire Co., North Main street, Los Angeles, California.

INNER TIRE WITH RUBBER PIERS AND RIBS

THE OBLONG RUBBER BUTTON FOR GARTERS

A new feature of certain well-known garters is the oblong rubber button clasp used on the "Velvet Grip" hose supporter and also on the "Natty-Pad Boston" garter, a newly trade-marked style which the manufacturer has sold so far only in South America. The advantages of the new style of button, according to the makers, are that no single thread can be overstrained, owing to the large number of threads clasped around the oblong shank. For this reason no ordinary strain can injure the most delicate stocking, and dropped stitches are reduced to a minimum.—George Frost Co., 551 Tremont street, Boston, Massachusetts.

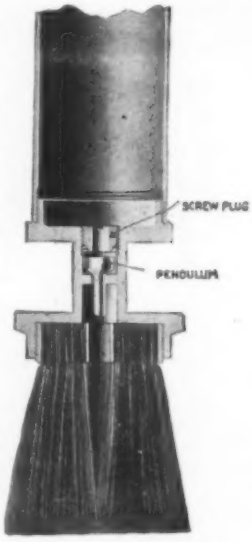
"NATTY-PAD" GARTER BUTTON



OBLONG RUBBER BUTTON

FOUNTAIN STENCIL BRUSH

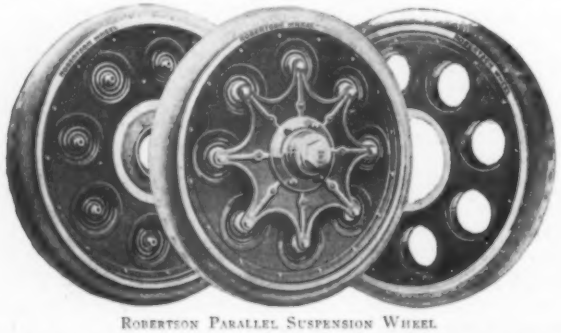
A convenience for shipping departments is a hard rubber fountain stencil brush for marking or stenciling packing cases for freight and express shipments. The ink is contained in the cylindrical hard rubber handle of the brush, somewhat on the principle of a fountain pen. Below the screw plug which closes the barrel is a pendulum which regulates the flow of ink. Rubbing the brush across the stencil moves the pendulum, allowing the ink to reach the bristle tip. New bristle tips can be obtained. This brush is patented in the United States and foreign countries.—Garvey Fountain Brush & Ink Co., 7th and Howard streets, St. Louis, Missouri.



GARVEY STENCIL BRUSH

PARALLEL SUSPENSION WHEEL

In order to distribute the load remote from the center of this wheel and as near the rim as possible, the inventor devised a series of flanged housings for the spiral spring cushioning elements. These keep the springs in alinement with respect to other parts of the wheel. Within these springs is suspended the fixed, spider portion, fastened to the rubber-cushioned hub. The hub cushion acts to keep the rim in concentric relation to the center and prevents convulsive vibration of the springs around the rim. Within the spider plates around the hub are large hard fiber washers which function against steel plates and serve to check the lateral displacement of the rim in the event of skidding. There being no friction during the normal operation of the wheel, this is only a precautionary measure against severe lateral thrusts. The wheel thus takes care of all vertical, torsional, tangential, lateral, and radial thrusts. It is said that tires mounted on this wheel last longer and that more mileage is made on a given quantity of gasoline with this wheel equipped with an ordinary solid rubber tire, than with a rigid wheel equipped with a pneumatic tire.—Robertson Resilient Wheel Corporation, 1697 Broadway, New York City.


ROBERTSON PARALLEL SUSPENSION WHEEL

A SELF-FILLING FOUNTAIN PEN

A fountain pen that will never "sin" is the manufacturer's quaint description of the "Master," a self-filling model with patented features that prevent leaking, inking the fingers, and kindred faults. The barrel is of hard rubber, with especially large ink reservoir, so that many letters can be written without refilling. The pen is a 14-karat gold one.—Bankers' Pen Co., 76 Fifth avenue, New York City.


"MASTER" FOUNTAIN PEN


JUNG ARCH BRACE

ELASTIC ARCH BRACE

A corrective appliance, said to be superior to the ordinary arch supports, is made of elastic webbing, reinforced at the shaped front part with a stitched strip of fabric. The 2-inch "XXX" and the 3-inch "Miracle" are light in weight and comparatively thin. Patented three years ago, and recently put on the market, druggists and shoe dealers now sell this brace.—The George H. Jung Co., Cincinnati, Ohio.

A FABRIC AND CORD TIRE

Another cord tire for which the makers claim special features is the "Fabri-Cord" tire, which is absolutely guaranteed against stone-bruise blowouts. "Fabri-Cord" tires combine fabric plies and cord plies in their construction, having two inner plies of heavy fabric next a cushion of live rubber from bead to bead, then two plies of cord for resiliency, two more plies of fabric, two more of cord, one of fabric to prevent loosening, and outside of these a rubber cushion ply, a breaker and a long-wearing heavy tread. This unique construction is shown in the accompanying illustration, and is peculiar to the "Fabri-Cord" tire. It claims to get full mileage from every ounce of rubber in the tread.—Terrell Tire & Rubber Co., Kansas City, Missouri.


"FABRI-CORD" TIRE

THE "CUDDLE-UP" HOT-WATER DOLL

The "Cuddle-Up" doll is a doll-shaped rubber hot-water bottle with a very warm spot in its heart for little babies. It is practical and its efficiency is in no way spoiled by its odd shape. It is provided with a knitted suit that serves as clothes and cover, adding to its comforting powers when placed in baby's carriage or at the little feet. The "Cuddle-Up" doll will doubtless prove a very popular gift, one that can be appreciated by the mother and loved and cherished by the child.—Alden R. Chambers, 757 Boylston street, Boston, Massachusetts.

Activities of The Rubber Association of America

MEETINGS

A MEETING of the Rubber Reclaimers' Division of the Association was held in New York City on November 9, at which prevailing trade conditions were discussed in a general way, as a result of which a joint conference of scrap rubber dealers and reclaimers was held in New York on November 19.

A meeting of the Hard Rubber Division was held in New York City on the 24th instant.

The next meeting of the Board of Directors is scheduled for November 30 at New York City.

The November regular meeting of the Mechanical Goods Executive Committee was held in New York on Tuesday, November 23.

The November regular meeting of the Executive Committee of the Tire Manufacturers' Division, scheduled for Wednesday, November 17, was omitted. The next meeting of this Committee will be the December regular meeting on December 15.

GENERAL

The Association has undertaken the gathering of statistics on a monthly basis from individual tire manufacturers who are members of the Tire Manufacturers Division, relative to the inventory, production and shipments of pneumatic and solid tires and inner tubes and the amount of cotton fabric and crude rubber consumed in that production, the Association in turn to furnish the totals compiled from the individual returns to each member participating in the arrangement. This work is progressing as rapidly as possible, and it is expected that, early in December, a report of total inventory, production and shipments as of November 30 will be available.

ANNUAL MEETING AND BANQUET

The regular annual meeting of The Rubber Association will be held at the Waldorf-Astoria Hotel, New York City, on the afternoon of Monday, January 10, 1921. On the evening of that day, the twenty-first annual dinner of the Association will be held in the grand ball-room at the Waldorf-Astoria. Information will soon be transmitted to members of the Association concerning the price of the dinner tickets, the names of the speakers, etc.

RECOMMENDED SPECIFICATIONS FOR PNEUMATIC CORD TIRES

The following is a reproduction of a resolution adopted by a majority vote of the Executive Committee of the Tire Manufacturers' Division on July 29, 1920, concerning minimum and maximum cross section widths of pneumatic cord tires, with an amplification of the resolution in the form of a detailed list of minimum and maximum cross section widths of tires, rim sizes and widths, and standard S. A. E. inflation pressures:

RESOLUTION

In view of the well-recognized economic advantages which have been derived by the public and by the individual tire manufacturers as a result of the adoption by those manufacturers of the standardization program recommended by the War Service Committee, which program restricted the number of tire sizes, and with a view to retaining and extending these advantages by standardizing, as far as practicable, the actual sizes of tires made in accordance with that program;

NOW THEREFORE, it is resolved that the Executive Committee of the Tire Manufacturers' Division recommends to the individual tire manufacturers who are members of that division that the actual cross-sectional width of pneumatic cord tires when inflated in accordance with the S. A. E. standards be not less than the nominal width marked thereon or greater than ten per cent in excess of such nominal width; it being understood, however, that the nominal width of the so-called 5-inch tire shall, in accordance with custom, be considered as 5¼ inches.

A. L. VILES, General Manager.

MINIMUM AND MAXIMUM CROSS-SECTION WIDTHS OF PNEUMATIC CORD TIRES

Marked Size	Cross-Section Dimensions (In Inches)	Minimum	Maximum	Rims Size	Rims Width	Inflation Pressure Lbs. Per Sq. In.
30x3½	Cl.	3.50	3.85	30x3½	2.05	50
31x4	Cl.	4.	4.40	30x3½	2.05	60
32x3½	S.S.	3.50	3.85	32x3½	2.3125	50
32x4	S.S.	4.	4.40	32x4	2.6875	60
33x4	S.S.	4.	4.40	33x4	2.6875	60
32x4½	S.S.	4.50	4.95	32x4½	3.125	70
33x4½	S.S.	4.50	4.95	33x4½	3.125	70
34x4½	S.S.	4.50	4.95	34x4½	3.125	70
33x5	S.S.	5.25	5.77	32x4½	3.125	80
34x5	S.S.	5.25	5.77	34x5	3.75	80
35x5	S.S.	5.25	5.77	34x4½	3.125	80
36x6	S.S.	6.	6.60	36x6	4.33	90
38x7	S.S.	7.	7.70	38x7	5.	100
40x8	S.S.	8.	8.80	40x8	6.	110
42x9	S.S.	9.	9.90	42x9	6.67	120
44x10	S.S.	10.	11.	44x10	7.33	130
48x12	S.S.	12.	13.20	48x12	9.	140

The cross-section dimensions referred to are those of the finished tires and not the tire molds.

The cross-section dimensions referred to are to be determined by measuring new, unused tires not sooner than a half hour and not later than one hour after mounting on the rim and inflating to the S. A. E. standard pressure.

In determining the cross-section dimensions each tire is to be mounted on a wide standard rim of the same nominal size as the tire, with the exception of the 31 x 4 Cl., the 33 x 5 S. S., and the 35 x 5 S. S., which are to be measured, respectively, on the 30 x 3½ Cl., the 32 x 4½ S. S., and the 34 x 4½ S. S. rim.

The only sizes to be affected by the recommended cross-section widths in the table are those perpetuated sizes which are now or which may be recognized as such by The Rubber Association of America, Inc., for original equipment by vehicle manufacturers, and this does not affect those other sizes which are to be produced to provide for replacements.

GUARANTY AGAINST PRICE DECLINE

New York, November 13, 1920.

To the members of the Tire Manufacturers' Division and the Footwear Division:

There is enclosed a copy of the brief filed by counsel for this Association with the Federal Trade Commission in connection with its inquiry into the practice by manufacturers of guaranteeing to the distributer or dealer protection against loss in the event of a decline in prices.

Previous communications from this office have informed you concerning the part taken by this Association in the investigation by the Commission, beginning with the development of information in detail concerning the exact practices and views of tire and rubber footwear manufacturers with respect to the subject and the presentation of an expression of opinion from the tire and rubber footwear industry to the Commission by a committee representing this Association at the "Trade Practice Submittal" or informal hearing, held by the Commission in Washington on October 5.

It is not expected that the Commission will issue any formal announcement as a result of its inquiry and the representations made to it by the various interested industries and it is thought that it will simply use the information obtained in disposing of such specific complaints as may come before it.

At the close of the informal hearing on October 5 the Commission announced that it would accept briefs from those who might wish to file them and counsel for this Association concluded that it would be advisable for us to take that action, and the enclosed copy is sent you as a matter of information.

A. L. VILES, General Manager.

IMPORTANT INFORMATION DESIRED FROM MEMBERS

New York, November 8, 1920.

To rubber manufacturers and reclaimers:

There is enclosed Questionnaire No. 103 in duplicate, calling for certain information concerning the business of your company for the first six months of the year 1920, which we are

desirous of having your company return, with the information asked for, within the shortest time possible.

This questionnaire calls for information similar to that which was obtained from questionnaires Nos. 101 and 102, covering the year 1919, and we are hopeful that with the increased familiarity of our members with this work the response will be much more prompt than heretofore.

A report of totals covering the year 1919 with respect to the average total daily number of employes, number of pounds of crude rubber consumed, and the total sales value of shipments of the manufactured product, has been prepared and is being distributed with this letter.

A. L. VILES, General Manager.

RUBBER TRADE INQUIRIES

THE inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

(831) A subscriber requests information as to substitutes for camel's-hair brushes for the application of rubber cement and tube splicing acid, and desires to know where they may be obtained.

(832) A manufacturer inquires where he can obtain selenium oxychloride.

(833) A correspondent desires the addresses of German manufacturers of electricians' gloves, net-lined white acid gloves, and sponge rubber, with view to exclusive sales proposition.

(834) A correspondent desires to know the best commercial method of finding the percentage of lead hydrates and lead carbonates in ordinary white lead.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Requests for each address should be on a separate sheet, and state number:

DISTRICT OFFICES	COOPERATIVE OFFICES
New York: 734 Customhouse.	Cleveland: Chamber of Commerce.
Boston: 1801 Customhouse.	Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, 96 Ingalls Building.
Chicago: 504 Federal Building.	Los Angeles: Chamber of Commerce.
St. Louis: 402 Third National Bank Building.	Philadelphia: Chamber of Commerce.
New Orleans: 1020 Hibernia Bank Building.	Portland, Oregon: Chamber of Commerce.
San Francisco: 307 Customhouse.	Dayton, Ohio: Dayton Chamber of Commerce.
Seattle: 848 Henry Building.	

(33,799) Quotations are desired in Australia on several tons of chicle. Information as to the time of delivery is requested.

(33,919) A merchant in France desires to purchase from American manufacturers and exporters ebonite in rods, plates and tubes, and vulcanized American fiber in plates, sticks and tubes.

(33,935) An agency for automobile tires is desired by a firm in France.

(33,940) A dental supply house in Japan desires to purchase, cash against documents, rubber in any quantity up to 500 pounds. Quote f. o. b. American port.

(33,965) A commercial agent in Serbia proposes to organize a trade bureau for the Balkans and later to open branches in Zagreb, Sofia, Bucharest, and Piræus, and maintain industrial exhibits and a warehouse for the sale of rubber goods and other American products.

(33,971) A commercial agency firm in Germany desires to import rubber goods, pneumatic tubes and covers for automobiles, vulcanized fiber, belting and mackintoshes.

(33,983) An English firm desires to purchase or secure an agency for raw materials of all kinds, especially those kindred to the rubber trade. Quotations should be given f. a. s. Atlantic ports or c. i. f. English ports. Payment to be made in New York or London against documents.

(34,011) A mercantile firm in Sumatra desires to place a trial order and secure an agency for the sale of tennis and golf balls. Complete catalogs and price lists are requested and also samples. Quote c. i. f. Belawan via Singapore or Batavia. Payment to be made by 30 days' draft, or through New York.

(34,013) An engineering equipment company in Wales desires to secure an agency for the sale of balata belting. Quote c. i. f. Welsh port.

(34,040) A commercial agent from the Far East, who is at present in the United States, is about to return to India and desires to secure an agency for the sale of rubber goods.

(34,055) A manufacturer in Chile wishes to receive catalogs and prices of machinery for making rubber goods, such as raincoats, overshoes, and boots. Payment to be in cash.

REVISED RUBBER TRADE LISTS

The following trade lists of importers of rubber goods have lately been revised and published by the Commercial Intelligence Section of the Bureau of Foreign and Domestic Commerce, and may be obtained from the Bureau by referring to the title and file number of the list desired.

	File No.
Importers of and dealers in rubber goods for industrial purposes in Canada	BE–1001
Importers of and dealers in rubber boots and shoes in Canada	BE–1002
Importers of rubber tires in Canada	BE–1003
Drug stores and dealers in druggists' sundries in Canada	BE–1004
Importers of and dealers in rubber goods in Newfoundland	BE–1005
Importers of various lines of rubber goods in London, England	BE–2001
Importers and manufacturers of rubber goods in Glasgow, Scotland	BE–4001
Importers of rubber goods for industrial purposes in Copenhagen, Denmark	EUR–2031
Importers of rubber shoes in Copenhagen, Denmark	EUR–2032
Importers of rubber goods in Tunis, Tunis	EUR–3002
Importers of and dealers in rubber goods in Palermo, Italy	EUR–6001
Importers of rubber goods in Lisbon, Portugal	EUR–10010
Importers of rubber goods in Tangiers, Morocco	EUR–17000
Importers of rubber goods in Colombia	LA–14009
Importers of rubber goods in Norway	EUR–9012
Importers of insulated wire and friction tape; rubber goods for industrial purposes, in Rio de Janeiro, Brazil	LA–12004
Importers of rubber coats in Rio de Janeiro, Brazil	LA–12005
Importers of toys and games in Rio de Janeiro, Brazil	LA–12006
Importers of rubber tires in Rio de Janeiro and Bahia, Brazil	LA–12007

INTERESTING LETTERS FROM OUR READERS

A REMEDY WANTED FOR PITTING VULCANIZERS

TO THE EDITOR:

DEAR SIR:—

It has been brought to the writer's attention that sulphurous acid was being formed in the heater during the vulcanization of hard rubber.

Have any articles been published in THE INDIA RUBBER WORLD explaining the formation of sulphur dioxide and giving a remedy for the pitting of vulcanizers?

POWER ENGINEER.

When sulphur is used as a vulcanizing agent, sulphur dioxide will form in the vulcanizer and there is no way to prevent it. The article, "Steam Requirements for Vulcanizing," published in THE INDIA RUBBER WORLD, October 1, 1920, deals with this question.—THE EDITOR.

"PONTOP" FOR COLLAPSIBLE AUTOMOBILE TOPS

New live rubber and an extra heavy fabric base give exceptional flexibility and rugged strength to "Pontop," a new material for collapsible automobile tops. Severe usage is said not to harm "Pontop," destroy its beauty, or shorten its period of serviceability.—Du Pont Fabrikoid Co., Wilmington, Delaware.

THE OBITUARY RECORD

WELL-KNOWN CHICAGO MECHANICAL RUBBER MAN

FRANK B. HENDERSON, for twenty years general manager of the Chicago branch of The Manhattan Rubber Manufacturing Co., Passaic, New Jersey, died November 10, 1920, after six weeks' illness with pneumonia, at his home, 5036 Woodland avenue, Chicago, Illinois, aged 57 years.

FRANK B. HENDERSON

For many years Mr. Henderson was associated with E. B. Preston & Co. and W. D. Allen & Co., Chicago, and was one of the senior members of the mechanical rubber fraternity in Chicago. His next connection was with the Boston Woven Hose & Rubber Co., Cambridge, Massachusetts, where he remained only a few months, resigning to join the forces of the Manhattan company.

When The Manhattan Rubber Manufacturing Co. opened its Chicago branch, Mr. Henderson was appointed general manager and built up the business from practically nothing to the largest branch of the company. His death is regarded as a distinct loss to the firm.

He was a member of the Chicago Athletic Club, Midlothian Golf Club and South Shore Club, all of Chicago.

Mr. Henderson is survived by his widow, Nellie Henderson; two sisters, Miss Martha Henderson and Mrs. Edward Nell, of Indianapolis, Indiana; his daughter, Miss Ellen Henderson, and two brothers, Charles and Harry Henderson, associated with him in the rubber company.

The funeral was held November 12 from his late home. Burial was in Graceland Cemetery.

PROMINENT PITTSBURGH PURCHASING AGENT

ELVIN LOURINE MCGREW, purchasing agent and traffic manager of the Standard Underground Cable Co., Pittsburgh, Pennsylvania, died suddenly October 8, 1920, in the Hotel Imperial, New York City, while on an eastern business trip.

ELVIN L. MCGREW

Mr. McGrew was born in New Alexandria, Ohio, March 11, 1863. He was educated in the public schools of Jefferson County, and at the age of sixteen entered the employ of the Pennsylvania Railroad as a telegraph operator. He remained with the railroad in various capacities until 1900, at which time he resigned as agent in New Cumberland, West Virginia, and went to Pittsburgh to fill the position he held at the time of his death. In that capacity he was prominently identified with the rubber trade, being a large purchaser of various grades of crude stock for use in the production of rubber insulated wire at the factories of the company in Perth Amboy, New Jersey; Pittsburgh, Pennsylvania; Oakland, California, and Hamilton, Ontario.

Mr. McGrew was for two years president of the National Association of Purchasing Agents and one of the prime movers in its organization. He still retained his position as one of its directors. He was a member of the Methodist Episcopal Church, of Crafton, Pennsylvania, the Free and Accepted Masons, the I. O. O. F., The Traffic Club of Pittsburgh, and The Rubber Association of America.

He is survived by his widow, Annie Elliott McGrew, a daughter, Mrs. F. L. Dudgeon, and a son, Elliott B. McGrew, all of Crafton, Pennsylvania.

FORMER DIRECTOR OF UNITED STATES RUBBER CO.

Commodore E. C. Benedict, nearly 87 years of age, a retired banker and former director of the United States Rubber Co., New York City, passed away at his home at Indian Harbor, Greenwich, Connecticut, November 23, 1920, after more than a year of illness. A more extended obituary will appear in our January issue.

J. D. RAW, A DIRECTOR OF THE PORTAGE RUBBER CO., AND RETIRED merchant, died at his home, 317 Rhodes avenue, Akron, of heart failure, November 7, aged 67 years. He came to Akron from Marysville in 1909.

THE EDITOR'S BOOK TABLE

"PLANTATION RUBBER AND THE TESTING OF RUBBER." By G. Stafford Whitby, Ph.D., M.Sc., A. R. C. Sc., Assistant Professor, Department of Chemistry, McGill University, Montreal, Canada. Longmans, Green & Co., London, New York, Bombay, Calcutta and Madras. Cloth, illustrated, 5¾ by 8½ inches, xvi + 559 pages. This book is one of the "Monographs on Industrial Chemistry," edited by Sir Edward Thorp, C.B., LL.D., F.R.S.

IN this volume, Professor Whitby not only furnishes for students of the technology of rubber a systematic digest of published investigations on the preparation and testing of plantation rubber, but he discusses the data from the vantage point of his own scientific observations and study of the problems of plantation rubber production in the Far-East. The subject-matter is arranged in two main divisions:

PART I. The Preparation of Rubber. Treats of *Hevea brasiliensis* as cultivated; the occurrence and composition of rubber latex; methods of tapping, coagulating, preparation and characteristics of the various market grades of rubber.

PART II. The Testing of Rubber. Contains very full discussions on the following topics: stress-strain relations of rubber, technique of tensile tests and of vulcanization testing; progressive changes on vulcanization; comparison of raw rubber samples; stability of state of cure; technical mixes; viscosity determinations; hysteresis; elastic after-effect; relation of the thermal, optical and electrical to the mechanical behavior of rubber, concluding with a chapter on Poisson's ratio, which comprises the question of the change of volume of rubber on deformation.

A comprehensive bibliography is included, covering the original sources of the data presented. The volume is provided with a full index of subjects and one of authors.

Professor Whitby has earned the gratitude of every student of the technology of rubber by the very satisfactory way in which he has made available, in one volume, these results from widely scattered sources. The book will be valued as an authority in every rubber research and works laboratory.

PERSONNEL ADMINISTRATION, ITS PRINCIPLES AND PRACtice. By Ordway Tead and Henry C. Metcalf, Ph.D. McGraw-Hill Book Co., Inc., New York. Cloth, 538 pages, 6 by 9¼ inches.

Two members of the Bureau of Industrial Research, New York City, have set forth in this notable work the principles and best prevailing practice in the administration of human relations in industry. The field covered includes those efforts usually included in personnel management, employment, health and safety, training, personnel research, service features and joint relations. The relation of the personnel problems of each corporation to those of its industry as a whole is shown by considering the activities of employers' associations and the dealings which they may have with organizations of workers on a district or national scale. As illustrations, the successful procedure of many plants in varied industries is outlined, including the rubber and allied

trades which have been prominent in these activities. Special reference is made to the rubber text-book of The B. F. Goodrich Co., the training courses for executives of The Goodyear Tire & Rubber Co., the apprentice schools of the General Electric Co. and the Westinghouse Electric & Manufacturing Co., and the shop committee plan of the General Electric Co.

It is a book intelligently devoted to the most vital problem of the day in industry and will be read with interest and benefit by all employers, personnel executives, employment managers, students and teachers in schools of business administration who seek to advance better relations and greater productivity in industry through human cooperation, interest and creative power.

THE MOTORIST'S HANDBOOK ON VULCANIZATION. HARVEY Frost & Co., Limited, London, 1920. (Boards, 64 pages, 5¼ by 8 inches.)

The popularity of this little handbook is attested by the fact that it is already in its fourth edition. It expounds chiefly the methods of using H. F. portable vulcanizers without removing the tires from the wheels. In countries where the motorist is dependent upon himself for repairs the knowledge contained in this handbook might prove invaluable, and it contains much of interest to any car owner. Condensed instructions in French and Spanish are also given.

RUBBER PLANTING. A BOOK FOR THE PROSPECTIVE ESTATE Assistant in British Malaya. By C. Ward-Jackson. With a foreword by A. B. Milne and a map of British Malaya. The Incorporated Society of Planters, Kuala Lumpur. Boards, 63 pages, 5¼ by 8½ inches.

This is neither a text-book on the plantation rubber industry, nor a technical book of reference, but a much-needed hand-book for prospective rubber estate assistants, containing a wealth of reliable information about plantation life and work, the circumstances and cost of living in Malaya, and particulars of the terms of the contracts they are required to sign. The sections devoted to tropical health hints and necessary personal equipment are of particular interest. It is the only book of its kind and fills a long-felt want.

NEW TRADE PUBLICATIONS

THE CUTLER-HAMMER MANUFACTURING CO., MILWAUKEE, Wisconsin and New York City, has issued a profusely illustrated 64-page booklet entitled "Dictionary of Uses," which outlines the many adaptations of its C-H electric space heaters to various industrial and miscellaneous purposes. In the rubber industry they are being successfully used for drying cement in the manufacture of inner tubes and for tire aging. They are also employed for heating Bakelite ovens and molding machines.

"Protecting the Sprinkler System Against Freezing" is a four-page folder describing the application of C-H space heaters to the regulation fire extinguishing system of every factory.

THE LINK-BELT CO., CHICAGO, HAS RECENTLY PUBLISHED A BOOK covering its traveling water screens, which will be sent to anyone interested in effective, economical screening of condensing water. The book contains 24 pages and covers the subject fully.

THE FIRST COMPLETE BOOK ON BRAKE LINING EVER PUBLISHED has been brought out by the Thermoid Rubber Co., Trenton, New Jersey, and is entitled "The Dangers of Faulty Brakes." It is a 48-page, paper-bound volume, adequately illustrated by photographs, charts and original drawings showing the results of worn-out or faulty brake linings. Subjects covered include, "Dangers Created by New Motoring Conditions," "Friction," "Co-efficient of Friction," and a complete history of the process of making Thermoid brake lining.

THE 1920 YEARBOOK OF THE MERCHANTS' ASSOCIATION OF New York, recently distributed among its members, gives a summary of the Association's activities for the year ended May 1, 1920. Division XLIII included rubber, rubber goods and kindred lines, and has 47 prominent names listed therein. Other divisions well represented are the chemical, electrical and textile industries. The book also contains the by-laws of the Association and its plan of organization, illustrated by a chart. At the close of the year under review, the members of the Association included approximately 6,600 names.

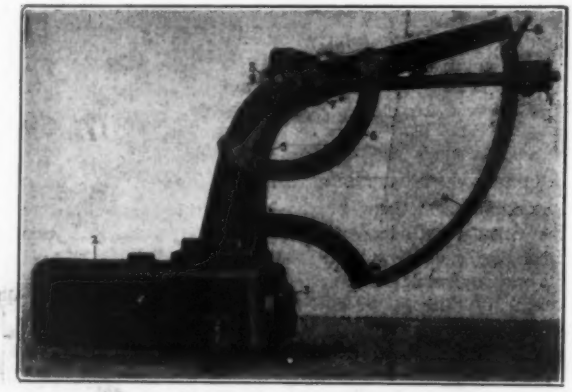
ELASTICITY TEST FOR SOFT RUBBER GOODS[1]

By Alfred Schob[2]

ELASTICITY is second only to plasticity in the manufacture of soft rubber goods. Several attempts have been made to construct an instrument for measuring the shock resistance of rubber; none, however, has found general application. The author has designed an instrument for measuring elasticity or resistance to shock of soft rubber which is simple in construction and easily operated. The test is applied to a rubber disk.

The apparatus is herewith shown as constructed by Louis Schopper in Leipzig, Germany. It consists of a simple pendulum (1) with a striking force weight of 200 grams and an anvil (2) 20 kilograms in weight. The test sample (3) is held upon the anvil by two springs. The pendulum is supported firmly above the anvil so that the instrument is compact. The extreme drop of the pendulum is 25 centimeters. The heaviest blow, therefore, represents 5 centimeters per kilogram. As the surface of the test sample is larger than the striking surface of the mallet it has been found advisable to make the striking surface hemispherical.

As shown, the apparatus is ready for use. By pressure upon the lever (9) the pendulum is released and drops upon the test sample. Shortly before the mallet strikes, the projection (7) engages the indicator (5) and carries it after the rebound to the maximum point reached on the scale (6). For a new test the



INSTRUMENT FOR MEASURING SHOCK RESISTANCE OF RUBBER

pendulum is suspended again at the lever (9) and the indicator is reset by pulling out the knob (8). The indicator scale is not graduated in degrees of arc but is based on the percentage of the drop distance so that it is possible to read directly the result. To permit tests with different drop distances of the pendulum the release lever may be fastened at different places on the pendulum guard or arc. The graduations on the scale read for both full drop and half drop tests. If other drop distances are used one simply reads the result of the full drop and multiplies this with the reciprocal value. If, for instance, the test is made with 0.3 of the drop distance the result is multiplied by $1 \div 0.3$. No allowance is made for friction and air resistance. In reality these are very small. The errors caused by friction and air resistance amount to 2 per cent approximately.

It is absolutely necessary in making elasticity tests of soft rubber to standardize the character and condition of the testing sample. Upon this basis it will be possible to make exhaustive tests of various kinds of caoutchouc in different mixtures and degrees of vulcanization.

[1] Gummi-Zeitung, August 13, 1920.
[2] German Government Material Testing Office, Berlin-Dahlem.


The Goodrich A

News of the American Rubber Industry

DIVIDENDS

THE AJAX RUBBER CO., INC., New York City, has declared a quarterly dividend of $1 per share, payable December 15 on common stock of record November 30, 1920.

The Brunswick-Balke-Collender Co., Chicago, Illinois, recently declared its quarterly dividend of one and three-quarters per cent, payable November 15 on common stock of record November 5, 1920.

The Canadian General Electric Co., Limited, Toronto, Ontario, has declared its quarterly dividend of two per cent on stock of record December 15, 1920, payable January 1, 1921.

The Converse Rubber Shoe Co., Malden, Massachusetts, has declared the semi-annual dividend on its seven per cent preferred stock.

The Firestone Tire & Rubber Co., Akron, Ohio, recently declared its quarterly dividend of one and three-quarters per cent, payable November 15 on preferred stock of record November 1, 1920.

The General Electric Co., Schenectady, New York, has declared a quarterly dividend of $2 per share and a semi-annual dividend of two per cent in stock, both payable January 15 on stock of record December 8, 1920.

The B. F. Goodrich Co., Akron, Ohio, and New York City, has declared a quarterly dividend of $1.50 per share, payable February 15, 1921, to common stock of record February 4, 1921, and a quarterly dividend of $1.75 per share, payable January 1, 1921, to preferred stock of record December 21, 1920.

Hamilton Tire & Rubber Co., Detroit, Michigan, declared a cash dividend of six per cent on all stock of record at its annual meeting in October.

The Hood Rubber Co., Watertown, Massachusetts, has declared a quarterly dividend of one and three-quarters per cent payable November 1 to stock of record October 20, 1920.

The National Aniline & Chemical Co., New York City, has declared a quarterly dividend of one and three-quarters per cent, payable December 31 on preferred stock of record December 13, 1920.

Swinehart Tire & Rubber Co., Akron, Ohio, has deferred payment of dividend on the common stock, but has declared the regular quarterly dividend on the preferred stock, payable December 15, 1920.

FINANCIAL NOTES

At a special meeting of the common stockholders of the Hood Rubber Co., Watertown, Massachusetts, October 27, it was voted to change the existing common stock into 100,000 shares of common stock without par value and holders of the outstanding common stock heretofore having a par value of $100 a share were notified to exchange the certificates therefor for shares of common stock without par value on the basis of two shares without par value for each share previously outstanding, this exchange to be made as of November 5, 1920. From that date dividends are to be declared on shares without par value only.

The Goodyear Tire & Rubber Co., Akron, Ohio, has passed the quarterly dividend on the common stock for the first time in its existence of 22 years. The outstanding common stock exceeds $61,000,000, and the outstanding preferred approximates $59,000,000. The action on the regular quarterly dividend on the preferred will be taken in January. The common paid 12 per cent annually until the last meeting, when it was reduced to 10 per cent.

Net sales of the Lee Tire & Rubber Co., the operating organization of the Lee Rubber & Tire Corporation, for the nine months ended September 30, last, amounted to $6,204,586, compared with $4,492,189 in the same period in 1919, an increase of $1,712,397. After all charges, but before tax reductions, there was a net profit in the nine months of $640,684, contrasted with $460,512 in the same period a year ago, an increase of $180,172.

In reply to a request for a statement regarding the dividend policy of the United States Rubber Co. and of its position generally, Colonel Samuel P. Colt, chairman of the board, said:

"The officials of the United States Rubber Co. see no reason to change the policy of the company adopted over a year ago when the common stock was placed upon an 8 per cent dividend basis.

"The profits of the company for the year will substantially exceed all regular dividend requirements, notwithstanding the falling off in the tire trade, which constitutes only one-third of the entire business of the company.

"The company's situation as to crude rubber, in which there has been an unusual price decline, is all that could be asked. The company has no forward contracts and, therefore, has taken advantage of making purchases at the lower levels of prices, which, together with the substantial supply from its own eastern plantations, puts the company in a most favorable position as to crude rubber.

"The company has heretofore made liberal reserves from income to cover possible shrinkage in inventory values due to decline in prices."

The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio, will reduce the par on its capital stock from $100 to $10 a share. Calling in the old stock has resulted in a drop in value on the local exchange from $40 to $4.50 a share.

The stockholders of the Westinghouse Electric & Manufacturing Co. have authorized an increase of $30,000,000 in the indebtedness of the company, and also increased the capital stock from $75,000,000 to $125,000,000.

NEW YORK STOCK EXCHANGE QUOTATIONS

NOVEMBER 20, 1920

	High	Low	Last
Ajax Rubber Co., Inc.	32½	31¾	31¾
The Fisk Rubber Co.	14¼	14	14
The B. F. Goodrich Co.	41	40¾	41
The B. F. Goodrich Co., pfd.	80¼	80	80
Kelly-Springfield Tire Co.	41	40½	41
Kelly-Springfield Tire Co., pfd.	...	...	...
Keystone T. & R. Co., Inc.	8⅞	8¾	8⅞
Lee R. & T. Corp.	17¾	17¾	17
United States Rubber Co.	61½	59	59½
United States Rubber Co., pfd.	100½	100½	100½

CLEVELAND STOCK EXCHANGE QUOTATIONS

The following quotations on the Cleveland Stock Exchange, November 19, of stock of the principal rubber companies were supplied by Otis & Co., Cuyahoga Building, Cleveland, Ohio.

	Last Sale	Bid	Asked
Firestone T. & R. Co.	103	100	...
Firestone T. & R. Co., 1st pfd.	87½	85½	88¼
Firestone T. & R. Co., 2 pfd.	81½	...	85
General T. & R. Co., pfd.	89	...	...
The B. F. Goodrich Co.	41½	...	...
The B. F. Goodrich Co., pfd.	83	...	...
The Goodyear T. & R. Co.	42¾	41	42
The Goodyear T. & R. Co., pfd.	69	68¾	69
Kelly-Springfield T. & R. Co.	49	...	...
Kelly-Springfield T. & R. Co., pfd.	120	...	...
The Miller Rubber Co.	99	90	99
Portage Rubber Co.	45	...	38
Portage Rubber Co., pfd.	57½	56	...
Star Rubber Co.	350¾	...	...
Swinehart T. & R. Co.	39	...	...
Victor Rubber Co.	16	15	22

NEW INCORPORATIONS

Ash, Claudius, Sons & Co., U. S. A., Inc., October 11 (New York), $150,000. Charles A. Sykes, president and treasurer; Clarence E. Greene, vice-president; Matthews Brown, secretary. Principal office 1 and 3 Union Square, New York City. To manufacture dental rubber.

Cartwell-Wilson Tire Co., Inc., November 6 (New York), $10,000. W. B. and J. Wilson, both of 64 Bedford avenue; I. M. Coggins, 804 Mutual Life Building—all of Buffalo, New York.

Chase Tire Sales Corporation, October 26 (New York), $50,000. L. G. and A. M. Chase—both of 14 Verona place; B. C. Ribman, 125 Prospect Park, West—all of Brooklyn, New York. To deal in automobile tires.

Cotton Rubber Works, The, November 6 (Delaware), $25,000. W. I. N. Lofland, F. Jackson, C. L. Harmonson—all of Dover, Delaware.

Downing Tire Stores Corporation, November 19 (New York), $100,000. D. R. Downing, 1985 Creston avenue, Bronx, N. Y.; C. M. and C. J. Downing—both of South Orange, N. J. To manufacture automobile tires, etc.

Estates Crude Rubber Corporation, The, November 16 (New York), $25,000. E. C. Sweeney, Jr., Hartsdale; W. P. McKown and L. Caminez, both of 50 Church street, New York City—both in New York. Principal office, New York City. To deal in crude rubber.

Federal Detachable Rim & Wheel Corporation, November 17 (New York), $2,000,000. L. G. Lacy, P. H. Fitzpatrick, C. Hanna—all of Syracuse, New York. Principal office, Syracuse, New York. To manufacture automobile wheels and rims.

International Products Corporation, November 18 (Delaware), $1,000,000. T. L. Croteau, M. A. Bruce, S. E. Dill—all of Wilmington, Delaware. To deal in crude rubber and to manufacture rubber, etc.

Jefferson Rubber Co., The, October 1 (Wisconsin), $303,000. R. W. Lyons, president; C. R. Girton, vice-president; W. E. Taube, secretary; W. S. Henry, treasurer. Principal office, Jefferson, Wisconsin. To manufacture rubber products, including cord and fabric tires and inner tubes.

Leatherware Company, The, October 28 (New Jersey), $250,000. H. H. Picking; C. O. Geyer; Gordon Grand. Principal office, 525 Main street, East Orange, New Jersey. To buy, sell and otherwise deal in and with, and to export and import, leather-substitute compositions and compounds, rubber compositions and compounds, paper compositions and compounds, etc.

Lorraine Rubber Co., Inc., November 10 (New York), $20,000. C. and R. Bernheim, 18 Wilson place, Mt. Vernon; S. Solomon, 616 W. 207th street, New York City—both in New York. Principal office, Bronx, N. Y. To manufacture rubber goods.

Northeastern Rubber Co., Inc., October 22 (New York), $250,000. M. Boyle; R. Swinnerton; A. B. Royce—all of 31 Nassau street, New York City. To deal in crude rubber, etc.

Paragon Tire Corporation, November 10 (Delaware), $20,000. W. I. N. Lofland; F. Jackson; R. Dunn—all of Dover, Delaware.

Protex-In-Tire Co., Inc., October 26 (New York), $25,000. J. Steinman; L. E. Jennings—both of 176 Livingston street; H. W. Brock, 478 Jefferson street—both of Brooklyn, New York. To manufacture inner liners for tires.

Star Rubber Co., The, November 19 (New York), $10,000. G. Norris, F. L. Driscoll, H. Buette—all of 115 Broadway, New York City. Principal office New York City. To manufacture automobile tires, etc.

Tire Improvement Corporation, October 22 (Delaware), $500,000. T. L. Croteau; M. A. Bruce—both of Wilmington, Delaware.

PERSONAL MENTION

Edward S. Babcox has become vice-president of the *India Rubber Review*, published in Akron, Ohio, which has recently been taken over by a corporation, the editorial and business policies remaining unchanged. Mr. Babcox is well known through former connections with the Firestone Tire & Rubber Co., the Rubber Products Co., *The Christian Herald*, and The Akron Advertising Agency Co.

Charles E. Campbell, for the past 18 years factory manager of the Ashland, Ohio, plant of the Camp Rubber Co. and the Faultless Rubber Co., has removed to his new home at Great Neck, Long Island. Mr. Campbell expects to spend the balance of the current year in a study of manufacturing conditions in the East, with the idea of establishing himself in the rubber sundries manufacturing line about January 1.

J. H. Mullen, who is associated with the St. Louis office of The Manhattan Rubber Manufacturing Co., recently sailed for Paris on the "Olympic," accompanied by Mrs. Mullen. They will tour France, Italy, Switzerland and Spain.

John B. Tuttle, recently chief chemist of Plant No. 2 of the Firestone Tire & Rubber Co., Akron, Ohio, has severed his connection with that company to enter business for himself. He has opened an office at 68 Bank street, New York City, as a consulting chemist and rubber technologist.

Arthur G. Spurlock has been appointed treasurer of the H. H. Robertson Co., Pittsburgh, Pennsylvania, in charge of finances, accounting, credit, collections, etc. For the past four years, Mr. Spurlock has been associated with the American Refractories Co., Chicago, in a similar capacity. The large growth of the H. H. Robertson Co.'s business has necessitated separating the duties of secretary and treasurer, formerly fulfilled by Joseph Myshrall. Mr. Myshrall will continue as secretary in charge of corporate records and correspondence, contracts, office management and similar duties.

S. R. Converse, since 1916 assistant advertising manager of The Goodyear Tire & Rubber Co., has resigned to become advertising manager of the Dunlop Tire & Rubber Corporation of America, Buffalo, New York.

RECENT CHANGES IN ORGANIZATION AND PERSONNEL OF UNITED STATES RUBBER CO.

The new organization plan of the United States Rubber Co. places under unified control the manufacturing and selling activities of the two groups of the company heretofore known as the Mechanical Goods Division and the Footwear Division. It creates the position of second vice-president for four of the company's executives, and it effects a new grouping of other departments and provides new responsibilities for many individuals in the organization.

Vice-president Homer E. Sawyer takes general charge of the two divisions which have been merged. Vice-president J. Newton Gunn will remain in general charge of tires and accessories.

George H. Mayo and Edward J. Coughlin have been made second vice-presidents to serve under Mr. Sawyer. Mr. Mayo will have under his general direction all sales of footwear, clothing, mechanical and miscellaneous goods, while Mr. Coughlin will have charge of the large group of factories engaged in their manufacture.

Mr. Mayo will be assisted by Charles C. Case as general manager, mechanical sales; William F. Enright, general manager of footwear sales; N. Lincoln Greene, general manager of clothing sales; and W. E. Barker, general manager, tire sales.

Mr. Coughlin will be assisted by Myron H. Clark as general manager, footwear and miscellaneous factories, and Harlow W. Waite as general manager, mechanical factories.

Charles J. Butler has been appointed second vice-president of the United States Rubber Co., in charge of tire manufacturing. He will be assisted by George W. Seiberling as general manager of tire factories, and has appointed the following, also: Erwin Meyer, chief consulting chemist, tire factories; John J. Shea, factory manager, Colt Plant, Revere Rubber Co., Providence, Rhode Island; A. P. Delahunt, chief accountant, Colt Plant, Revere Rubber Co., Providence, Rhode Island. George S. Shugart, vice-president of the United States Tire Co., remains in charge of tire sales.

Raymond S. Willis has been appointed second vice-president and will have general charge of purchasing, stocks of raw materials and supplies, and transportation. He will be assisted by William H. Marsh, general purchasing agent; George F. Hichborn, general traffic manager; and James A. Reilly, general storekeeper.

Cyrus S. Ching has been appointed supervisor of industrial relations, Charles F. Lindsay becomes technical assistant to the president, and Eric C. Burkman, executive secretary, president's office.

William G. Parsons has relinquished the title of comptroller, but will continue as vice-president with general supervision over the accounting and treasury departments. Henry B. Hubbard has relinquished the title of assistant comptroller and has been appointed financial manager of sales. William O. Cutter, formerly assistant comptroller, has been appointed comptroller and Harold B. Grouse and Herbert M. James, assistant comptrollers.

Second vice-president Mayo has announced the following appointments: Thomas J. Needham, formerly manager of the Omaha Branch, manager branch store sales; Charles A. Blake, formerly assistant to manager, footwear division, manager sundries sales; George E. Goodwin, manager clothing branch stores; Fred P. Lundy, formerly assistant to A. W. Lawrence, supervisor leather and felt footwear branch stores; John J. Meacham, formerly manager of the St. Louis footwear and clothing branch, manager of the Omaha general branch; C. P. Melton, formerly manager of the Dallas footwear and clothing branch, manager of the St. Louis footwear and clothing branch; Thomas P. Sullivan, promoted from assistant manager to acting manager of the Dallas branch; Walter H. Linck has been promoted from assistant manager to manager of the Philadelphia footwear and clothing branch.

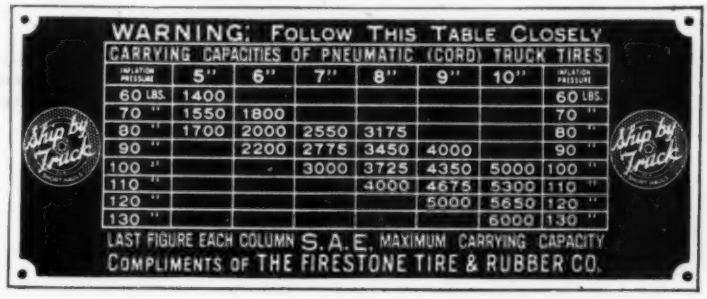
C. C. Case, general manager mechanical sales, has announced the following appointments; W. Gussenhoven, formerly central district manager, mechanical goods division, general sales manager mechanical goods, with headquarters in New York; F. B. Williams, formerly assistant to general manager mechanical goods division, manager of agricultural line, canvas belting (including tractor belts), jar rings, plumbers' specialties, and molded specialties; H. L. Williamson, manager of mechanical production and sales development department, to have supervision over construction, production, changes, eliminations, or additions to mechanical lines; J. A. McIntosh, assistant manager of mechanical production and sales development department; S. E. Abramson, formerly western manager conveyor belt department, district manager central district; E. F. Brownworth, formerly manager packing department, supervisor store stocks; H. N. Winner, manager packing department.

W. F. Enright, general manager footwear sales, has announced the following appointments: Edward R. Bartlett, formerly manager of Philadelphia branch, production manager footwear sales; H. J. Haefelein, formerly assistant to general selling agent, distribution manager footwear sales.

AN OVERLOADING AND UNDERINFLATION WARNING

One of the most costly errors made by motor truck drivers is the careless underinflation of tires. Like overloading, this practice causes rapid deterioration of the tires and eventually a big cash loss to the truck owner.

The Firestone Tire & Rubber Co., Akron, Ohio, is now sending to truck manufacturers who equip their output with Firestone tires a stock of hand-etched zinc plates, 2 by 5 inches in size, to be attached to the cowl of each truck before it leaves the factory. The plate bears a warning against overloading and underinflation, together with a table showing the carrying capacity of pneumatic (cord) tires of various sizes and the proper inflation for each. The figures are based on computations made by the Society of Automotive Engineers. A pamphlet with full instructions for the application of giant cord tires and demountable rims is also furnished for placing in the tool box of each truck, as a ready reference.



A SECTIONAL TUBE REPAIR

When a tube blow-out covers an area which it is impossible to repair by patching, and where the condition of the remainder of the tube is such that a new section is justified, a new section should be inserted 5 inches longer than the section removed. This will allow a 2½-inch lap at each end, to insure adequate strength.

Bevel the inside edges of the tube and the outside edges of the section to be inserted. This may be done by turning the edges over a splicing or wooden mandrel, and beveling ½-inch from the end. Use a sharp knife. The work will be facilitated, if the knife is kept wet.

Buff the beveled edges 3 inches back from each end of both tube and insert, and apply two coats of .048 cement, allowing each to dry. Then apply the acid curing solution about 2 inches in width with a camel's-hair brush and quickly slide the tube off the large mandrel over the turned back edge of the tube on the smaller mandrel. This should be accomplished in not more than ten seconds, owing to the rapidity with which the acid curing solution vulcanizes. Wrap tightly with bands of rubber, approximately 1 inch wide and 2 feet in length. Allow to stand for fifteen minutes.—*Miller Tire Trade News.*

THE "BULL DOG" INNER TIRE

The "Bull Dog" inner tire is an article that, according to its manufacturer, would save the lives of thousands of tires if their owners could be converted to its use. It is constructed of three plies of Sea Island tire fabric vulcanized in pure rubber, formed exactly to fit inside the different sizes of tires. Bull Dog inner tires are said to reinforce a tire completely by adding three plies of fabric and can be installed by anyone in a few minutes. They vulcanize themselves in, will never creep, pinch or wrinkle, and are strong enough to stand the full pressure of the tube. By their use the makers guarantee that ninety-five per cent of punctures can be eliminated.—Eastern Auto Specialty Co., Utica, New York.

THE NEW HOME OF S. BIRKENSTEIN & SONS, INC.

December 1, 1920, is moving day for the home office and warehouse in Chicago, and the Philadelphia branch of S. Birkenstein & Sons, Inc., dealers in scrap rubber and other waste materials. On this day this old and well-known firm moves its executive offices and warehouse into the new $500,000 building at 1030 to

S. BIRKENSTEIN & SONS' NEW PLANT AT PHILADELPHIA, PENNSYLVANIA

1056 West North avenue, corner of Hawthorn street, Chicago, Illinois, probably the largest and finest building of its kind in America.

It is a substantial four-story structure of reinforced concrete, with street frontages of 335 and 100 feet, respectively, affording 90,000 square feet of floor space. At the rear it is served by two railroad sidings accommodating twelve freight cars. The plant is brilliantly lighted by large windows on all sides and thoroughly equipped with all the latest devices for handling the materials in which the firm deals, including three large electric elevators, several platform scales and smelting furnaces and presses in the basement. Commodious and handsomely furnished offices, including the general offices, eight private offices and a directors' room, occupy about one-third of the second floor. At the opposite end of this same floor, tastefully arranged rest rooms and shower baths are provided for employes.

The Philadelphia branch will move simultaneously into new quarters at 25th and Ellsworth streets, where with spacious offices and warehouse it will be in position to enhance the already splendid service this branch has been giving the Eastern trade.

The New York and Minneapolis offices, as well as the warehouses in St. Louis, Milwaukee, Dayton and Indianapolis, will remain as before. All told, the business now occupies some 400,000 square feet of floor space, as contrasted with the 7,500 square feet of the first Chicago warehouse.

Like most successful firms, the house of Birkenstein had a modest beginning and its expansion resulted from square dealing and steadfastness of purpose. The business was originated by Sigmund Birkenstein in 1866. In 1871 the unpretentious building which housed the entire business was destroyed in the great Chicago fire. The insurance companies were unable to make good the loss, but with only a good name and an indomitable will Sigmund Birkenstein paid his debts and started again. In 1890 he purchased his partner's interest and continued alone until in 1890 his son, Louis, became a partner and the firm name was changed to S. Birkenstein & Son. In succeeding years his sons, Harry, Albert and Milton, were admitted to the firm, which became S. Birkenstein & Sons. Sigmund Birkenstein died in 1900, but the sons have continued to develop the business, and in 1919 the firm was incorporated to enable many faithful employes to share its success by acquiring stock.

The present officers of the company are Louis Birkenstein, president; Harry Birkenstein, vice-president; Albert Birkenstein, secretary; Milton Birkenstein, treasurer, who, together with Jesse Long, manager of the New York office, constitute the board of directors.

PRICE GUARANTY ON RUBBER GOODS

The Federal Trade Commission at Washington recently heard representatives of manufacturing interests in a discussion of the trade practice of a guaranty against price decline. It was claimed that the custom tended to make lower prices to the consumer because of its stabilizing effect on markets. M. E Clark declared the rubber industry, of which he was spokesman, unable to operate effectively without use of the guaranty. He said that 55 out of 69 of the principal tire and rubber manufacturers employ it because of the seasonal demand for their products and because dealers will not accept the risk unless they have assurance that prices will remain at or above the level at which the purchase was made. Mr. Clark asserted that practically all manufacturers of motor tires had been compelled to make refunds to their dealers under the guaranty contracts when the slump in the markets came last year, and in his belief, as a result of the guaranty, the consumer had obtained the benefit of lower prices much sooner than had the dealers been loaded up on high-priced stocks on which they must carry their loss alone.

NEW HOME OF S. BIRKENSTEIN & SONS AT CHICAGO, ILLINOIS

THE RUBBER TRADE IN THE EAST AND SOUTH

By Our Regular Correspondent

NEW YORK AND EASTERN NOTES

THE CUTLER-HAMMER MANUFACTURING CO., MILWAUKEE, Wisconsin, has recently acquired the property at 137th street and Southern Boulevard, New York City, as an additional plant for the manufacture of "Thermoplax" and "Pyroplax" molded electrical insulation. The five-story building on this property has been completely equipped with presses for this work. When working at capacity the new plant will have an output equal to the company's insulation plant in Milwaukee, which has been running two shifts day and night for the past three years. The New York plant will take care of the company's eastern business and is in charge of F. J. Boller, formerly of the Milwaukee insulation department.

George R. Sweeney, George W. Sniffen, and Charles R. Sweeney have formed a crude rubber brokerage partnership to be known as Sweeney, Sniffen & Sweeney, with offices at 24 Stone street, New York City.

Wallace L. Gough, india rubber, gutta percha and balata, has reestablished his office at 12 State street, New York City.

The Allen Machine Co., Erie, Pennsylvania, recently removed its eastern and export department in New York City from 17 West 42d street to 5 Columbus Circle. M. A. Pearson is the sales engineer in charge.

Henry F. Lodge, the well known specialist in white barytes, has become associated with the J. C. Finck Mineral Milling Co., St. Louis, Missouri, and will be located with E. M. & F. Waldo, eastern sales agents for the Finck company, whose offices are at 11 Broadway, New York City.

Netherlands Corporation for Oversea Trade announces its removal from 135 Front street to 44 Beaver street, New York City.

The Alliance Tire Company has removed to larger quarters at 215 West End avenue, near 70th street, New York City.

The forty-first annual meeting of the American Society of Mechanical Engineers will be held December 7-10, 1920, at the Engineering Societies Building, 29 West 39th street, New York City. Transportation and its problems will be the keynote of the meeting and there will be a discussion of important phases by experts.

The Tireheal Manufacturing Co., which was recently incorporated, has offices at 17 Battery Place, New York City. It manufactures "Tireheal," a preparation used to heal punctures in automobile, motorcycle and bicycle tires. The officers are: V. S. Gavito, president; F. Troncoso, vice-president; Javier Pina, treasurer, and David R. W. Arscott, secretary.

The Powertown Tire Corporation, whose home office is at Buffalo, New York, has established a factory branch for the distribution of Powertown cord tires at 434 West Main street, Waterbury, Connecticut. Spencer B. Bedell is manager of the new branch.

PENNSYLVANIA NOTES

The Shenango Tire & Rubber Co. is erecting a plant 60 by 262½ feet at Greenville, Pennsylvania, for the manufacture of "Shenco" quality test cord tires and tubes. The building will be one- and two-story with basement, of concrete, brick and steel fireproof construction and is intended to be one of the most modern and efficient rubber plants in the country. The total estimated cost, including machinery, will be $225,000. The plant is expected to be ready for occupancy not later than May, 1921, and will have a capacity of five hundred tires and one thousand tubes per day. Officers and directors of the company are C. E. Shurtliffe, president and general manager; C. T. Kinney, vice-president; W. N. Raach, secretary and treasurer; H. J. Huff, and B. L. Eaton.

The Wyoming Tire & Rubber Co., Wilkes-Barre, Pennsylvania, has recently reorganized and has purchased the Perma-Loc Manufacturing Co. It is the company's intention to expand the business of the Perma-Loc and it is now doubling its selling force.

The Sure-Foot Heel & Rubber Co., Gettysburg, Pennsylvania, has been capitalized for $150,000, and incorporated under the laws of Pennsylvania, to manufacture a detachable rubber heel invented by S. F. Snyder, who is secretary and treasurer of the new corporation. Other officers of the company are O. J. McNitt, president; H. T. Weaver, vice-president; R. M. McKay, general manager. The directors include, besides these officials, P. B. Rice, W. E. Pitts and Henry Scharf, Sr. The company has a large brownstone factory building situated beside the tracks of the Philadelphia & Reading and Western Maryland railroads. Machinery has already been installed with a capacity of 200 gross of heels per day, and the general manager reports a large demand.

Allen Tire & Rubber Co., 510 Hamilton street, Allentown, Pennsylvania, reports that the first unit of its new plant at Bachman Terrace has been completed and practically all the machinery installed. The second unit is under roof and will soon be completed.

The United States Compression Inner Tube Co. Pittsburgh, Pa., expects to have the first unit of its plant at Kittanning, Pennsylvania, in operation about January 1, 1921. A large force of men is at work installing the equipment which includes rubber machinery of the latest type. The plant will be run by electrical power, steam being used only to cure the rubber and heat the plant in cold weather. The plant in Kittanning will be the largest of the company's three plants when all the units are built and will handle all business east of the Mississippi river.

The United States Rubber Co. has moved its Philadelphia office, sales, sample and stockrooms from its former location to 509 Market street, where several floors of that building are now occupied.

Plans are being prepared for a pumping station and rubber cement building for the Traveler Rubber Co., Bethlehem, Pennsylvania. The company manufactures automobile tires, and recently completed its main plant at a cost of about $150,000.

SOUTHERN NOTES

At a stockholders' meeting of The Dixie Rubber Co., 766 Randolph Building, Memphis, Tennessee, a new set of directors was elected as follows: R. J. Williams, John H. McBee, Robert M. Newton, A. B. Reese, R. E. L. Morgan, Dr. B. F. McNeal, C. B. Box, Dr. R. B. Crisler and W. H. Powell. William J. Green, who is assistant secretary-treasurer, reports the stockholders to be well pleased with the future prospects of the company.

Claude Hartwell has been made special factory sales representative of the International India Rubber Corporation, South Bend, Indiana, in charge of Indiana, Southern Ohio, Southern Illinois, and the States of Kentucky and Tennessee. Mr. Hartwell has a long and successful record as a tire salesman, and the advantage of a close personal acquaintance with the majority of tire buyers in the territory he is taking over.

F. J. Sellers has been appointed sales representative of the International India Rubber Corporation, South Bend, Indiana, to cover North and South Carolina, Georgia, Florida, Alabama, Mississippi, and Louisiana.

Louis Götting, general export manager of The Gordon Tire & Rubber Co., Canton, Ohio, has left for a trip of several weeks in Old Mexico and Cuba. Mr. Götting will establish a branch of the company's export department in Mexico City, and will return via Cuba where he will remain for some time to attend to the company's increasing business in that island.

HISTORY OF THE THERMOID RUBBER COMPANY

THE STORY of the growth of the Thermoid Rubber Co. begins in March, 1876, with the purchase by Allen Magowan, then superintendent of the Whitehead Brothers Rubber Co., of a triangular bit of farm land on the outskirts of Trenton, approximately forty acres in extent. Mr. Magowan was far-seeing in his purchase, and four years later he resigned his position and together with Frank A. Magowan and Spencer Alpaugh, founded the firm of Magowan, Alpaugh and Magowan, manufacturers of rubber, each of the three partners having an equal share. The triangular piece of farm land became the site of their two small buildings. The whole factory was only as large as the present brake lining and calender departments of the Thermoid Co., but excellence of products, not size of plant, is what builds firm reputations, and the new company's belting, hose, car springs and bumpers, packing, valves, and wringer rolls became well known, bringing deserved success.

A few years later the company built a factory for the manufacture of rubber carriage cloth and maintained it as the Empire Rubber Co. They afterwards bought the plant of the Star Rubber Co., moved the machinery of the Empire works there, absorbed the business, and added mechanical rubber goods and later bicycle tires to their line. About this time Mr. Alpaugh sold his interests to the Magowans and the company became known as the Trenton Rubber Works. In 1881 the concern was incorporated as the Trenton Rubber Co. The purchase of the Hamilton Rubber Co. in the early 90's enabled the Magowans practically to monopolize the rubber business in Trenton.

PLANT OF THE THERMOID RUBBER COMPANY, TRENTON, NEW JERSEY

Every business suffers reverses, however, and in 1895 and the two years following, one failure was weathered and a second occurred. The Trenton Rubber Co. was sold to the Stokes' interests, the name was changed to the Trenton Rubber Manufacturing Co., under which it was incorporated, September 7, 1897. Under the new ownership and management the company continued to grow, the most important addition to their line being asbestos products. The popularity of the company's brake lining increased to the extent where it became necessary to manufacture under a brand, to protect both trade and consumer. The name "Thermoid" was chosen, a derivative from the Greek *thermo* (hot), because the brake lining had demonstrated its unique resistance to heat. This trade mark became so well known that the company decided to adopt it as a firm name, and in July, 1909, the Trenton Rubber Manufacturing Co. became the Thermoid Rubber Co.

The automobile industry having given the most positive proof that it had become a factor in transportation and had come to stay, the Thermoid Rubber Co.'s expansion policy dictated the manufacture of such accessories as tires and tubes, radiator hose, rubber bumpers and the like. Increased production demanded additional floor space and in 1915 and 1916 new buildings were added, including a two-story structure for the hose and Thermoid-Hardy disk departments. Other buildings have followed, until at present the plant stands as shown in the illustration.

Backing a trade mark with the firm's integrity based the success of the Thermoid Rubber Co., which has been further established by a spirit of cooperation throughout the entire organization that enables it to face the future with increasing optimism.

THE RUBBER TRADE IN NEW JERSEY

By Our Regular Correspondent

TRENTON NOTES

THE SLUMP in the tire industry is still being seriously felt at the Trenton factories, especially where tires are the only product. The stock rooms of the plants have virtually been cleaned out of all grades of tires and the retail stores stocked up. Rubber manufacturers do not expect, however, that the tire industry will begin to show signs of activity until early spring. Some of the plants have laid off a number of tire makers, while others have cut down the working hours so that employes can do all their work by daylight, and find this a better plan than laying off tire makers. The mechanical end of the rubber industry is holding its own and is expected to be brisk during the winter. The slackening up in business also affects the plants where hard rubber goods are manufactured.

A number of Trenton rubber manufacturers were represented in the rubber divisions of the big political parades held in Trenton, both before and after election. The United & Globe Rubber Co. and the Globe Rubber Tire Manufacturing Co. had the largest turnouts. The Thermoid Rubber Co., Essex Rubber Co., and the Semple Rubber Co., had many floats in the line. The girl employes of the Essex company, dressed in white, paraded and sang political songs. John S. Broughton, president of the United & Globe Rubber Co., and Robert J. Stokes, secretary of the Thermoid Rubber Co. were members of the Republican committee in charge of the parade.

Frederick W. Bechtel, for eighteen years associated with the Empire Tire & Rubber Corporation, Trenton, as a mechanical engineer, has resigned to accept a similar position with the Crescent Insulated Wire & Cable Co., also of Trenton. The employes of the Empire company gathered in the main office of the company and presented Mr. Bechtel with a handsome gold watch as a token of the esteem in which he is held by them.

The Department of Rubber Technology of the School of Industrial Arts of the city of Trenton announces a course of twenty lectures by William F. Zimmerli, Ph.D., chief chemist of the Howe Rubber Co., New Brunswick, formerly assistant professor of chemistry in charge of the course in rubber chemistry at the Municipal University of Akron, Ohio. The course will cover the history, theory and practice of the rubber industry and is intended for all in the rubber industry without technical training who wish to broaden their knowledge of the general subject of rubber. Lectures will be given on Tuesday and Friday evenings during the months of December, January and February and questions and discussions will follow each lecture. For details, address Frank F. Frederick, director, The School of Industrial Arts, Trenton, New Jersey.

A verdict of $14,630 has been awarded in the United States District Court to the John E. Thropp Sons Co., Trenton, against the Hardman Rubber Corporation, New Brunswick. The Thropp company sued to recover the purchase price of equipment for

making tires furnished the Hardman company. The Hardman company contended that the apparatus was not usable and filed a counter claim. Judge Bodine dismissed the counter claim.

Sydney J. McCabe, connected with the Pocono Rubber Cloth Co., Trenton, has removed to Trenton from Leechburg, Pennsylvania, and purchased the West State street residence of William G. Zimmerman, vice-president of the Zee-Zee Rubber Co., of Yardville.

The Economy Tire Store has opened an establishment at 156 East Front street, Trenton, with George MacTighe as general manager.

The Grizzly Rubber Co. has opened a store at 576 Perry street, Trenton, and announces that a Grizzly tube will be given free with the purchase of every tire.

John O. Bigelow, 786 Broad street, Newark, New Jersey, who was recently appointed by the United States courts as receiver for the Trent Rubber Co., Trenton, has asked creditors of the company to present their claims. Mr. Bigelow intimates that the Trent Rubber Co. is solvent.

The executive and sales offices of the Globe Rubber Tire Manufacturing Co. are now located at its factory in Trenton.

MISCELLANEOUS NEW JERSEY NOTES

A questionnaire has been mailed by Warren C. King, president of the Manufacturers' Council of New Jersey, to more than 2,000 manufacturers, including the various rubber concerns, with the request that the manufacturers take a vote on the following: "Do you favor a continuation of daylight saving by moving the clock forward for one hour March 31 and returning to standard time on October 30 each year?" In his letter to the manufacturers President King said:

"Advocates of daylight saving have urged that it would prove a great benefit to factory workers. We have had two years' experience and the advantage is still a question. There has never been a vote taken on this important matter among the employes of the factories and the Manufacturers' Council feels that the opinion of the employes should be obtained to determine once and for all their desire to have daylight saving continued during the summer months."

The store of the Star Tire Exchange, 229 Broad street, Elizabeth, New Jersey, was damaged recently by fire to the extent of more than $15,000. The stock of the store amounted to $35,000, but some of the tires were saved.

The Atlantic City Tire & Rubber Corporation, Atlantic City, New Jersey, has purchased a site on Mediterranean avenue, where it will erect at once, for the manufacture of tires and tubes, a modern plant having a capacity of about 400 tires and 500 tubes per day.

Judge Freeman Woodbridge, of New Brunswick, New Jersey, has handed down a decision to the effect that theft insurance paid on a tire must be returned to the insurance company in the case of recovery of the tire. The owner of a machine at New Brunswick had a valuable tire stolen from his machine, and an insurance company adjusted the loss with him. It was later learned that the tire had been stolen as a joke and subsequently the insurance company demanded the return of the money.

John Tenney, president of the Howe Rubber Co., New Brunswick, has been made a director of the Hysig Co., Plainfield, New Jersey. This company contemplates the erection and equipment of a factory for the manufacture of the Hysig signal for motor cars.

De Mattia Brothers, Garfield, New Jersey, manufacturers of rubber mill machinery, have had plans prepared for a mezzanine floor type building to cost in the neighborhood of $200,000, to be erected adjacent to the present foundry at Clifton. Actual operation on the addition will be postponed until general conditions become somewhat more settled.

The NoCeem Rubber Corporation, Harrison, New Jersey, has the following officers; president, Harry S. Quick; vice-president and general manager, W. L. Fairchild; treasurer, Edward S. McGrath; secretary, Avery McDougall. It manufacturers the "NoCeem" corrugated red cord inner tube.

The Stockton Rubber Co., Stockton, New Jersey, was forced into bankruptcy in the United States District Court of New Jersey, owing to shortness of working capital. The plant of this company is at present in first-class condition and ready to resume operation.

The Rubberset Co., Newark, New Jersey, intends to erect a one-story machine shop at its Wilson avenue plant to conform with the general type of buildings now at this plant. The company reports its machine shop requirements have become so great that it is necessary to maintain a shop at this factory as well as the large machine shop at the Ferry street plant.

Employes of Brighton Mills, Inc., Passaic, New Jersey, have erected a fitting memorial to their coworkers who died in the World War. The monument, placed on a mound near the entrance to the Passaic plant, is a finely proportioned two-ton boulder bearing a bronze tablet with the following inscription: "Dedicated to the men of the Brighton Mills who made the supreme sacrifice. 1917—The World War—1919. Harry Miller, Neil Visbeck, Stephen Patrick, Richard Goggin, Jacob Halpern. Erected by their co-workers." The dedicatory services were held at the close of the day's work and were attended by hundreds of workers in both plants as well as by many of the relatives of the five men to whose memory the stone has been erected. The committee of arrangements for the dedication consisted of William A. McCann, John R. Meader and Edmund Sennert.

WATSON-STILLMAN CO. REWARDS LONG SERVICE

On November 1 the Watson-Stillman Co., manufacturer of rubber machinery, Aldene, New Jersey, conferred souvenirs of service on eight men who have been identified continuously with the firm for more than twenty-five years. A watch fob was presented to Carl Wigtel and suitably inscribed gold watches were presented to Walter Watson, William Graudorf, T. W. Hammond, A. D. Carnes, J. Hardy, William Koshwitz, William Meily and C. J. Wessels as tokens of appreciation.

Walter Watson, a skilled machinist and brother of the late Thomas Watson, completed his fiftieth year on that day and in commemoration of his long and faithful services he was presented with a check for $1,000 accompanied by appropriate resolutions in which it was stated that on Mr. Watson's voluntary retirement from employment the company would pay him $65 per month during his life, and on his death $50 per month to his wife during her life. A copy of the resolutions has been framed and placed in the company's offices and a handsome eight-page brochure devoted exclusively to the day's events has been printed.

THE RUBBER TRADE IN MASSACHUSETTS

By Our Regular Correspondent

BOSTON NOTES

THE REPRESENTAVIVES of the rubber trade present at the regular Fall meeting and luncheon of the New England Shoe Wholesalers' Association, held at Young's Hotel, Boston, on October 27, expressed the opinion that the rubber footwear industry is destined to be more prosperous than ever. That although there is a general feeling that prices of all commodities must be reduced, the rubber companies themselves have not yet reached that question, partly because rubber footwear prices have never advanced anywhere as much as those of leather footwear. As a matter of fact, advances in rubber and canvas footwear have been only between 27 and 30 per cent in the past 10 years. It was stated that during the past 10 or 15 years there has been a steady increase in the demand for fabric footwear. The cost of labor in the manufacture of canvas footwear is now about 41 per cent of the total cost,

as compared with 21 per cent prior to the war. The cost of crude rubber has declined to 11 per cent, compared with 25 per cent before the war, while the cost of fabrics is 27 per cent against 11 per cent formerly.

A. S. Carlton, for many years connected with Seaver & Co., has become associated with the Union Chemical Co., 27 Haymarket square, Boston, as vice-president. Mr. Carlton is considered an expert on carbon, lamp and bone blacks and gladly offers his assistance to all users of these materials.

One of the most interesting and instructive features of the annual meeting of The Associated Industries of Massachusetts was the round table discussion on financial questions conducted by Frank A. Vanderlip, a director of the United States Rubber Co. and formerly president of the National City Bank of New York. The two sessions of this conference were attended by over three hundred treasurers of member concerns, many of whom joined in the discussion and plied Mr. Vanderlip with questions, particularly regarding foreign exchange and its relation to industrial and political conditions in Europe.

Mr. Vanderlip referred to Frederic C. Hood's idea of extending help to a corporation that has got into difficulties as one of the finest ideas expressed in American finance.

S. M. Beatty has been appointed district manager of The Goodyear Tire & Rubber Co., with headquarters in Boston. Mr. Beatty joined the Goodyear forces eight years ago, handling inside sales at Springfield and has since made rapid progress, having been successively in charge of the Providence branch, manager of the Eastern division of the tire department, acting also as instructor to 300 men in the sales school teaching Goodyear policy, manager of the Philadelphia branch, and district manager at Indianapolis, in charge of the branches at Louisville, Indianapolis, Cincinnati, Dayton and Cleveland. He was tendered an official welcome when he took up his new duties.

J. Frederick Jones has been appointed manager of the Boston branch of the Portage Tire Co. Mr. Jones was previously with the Given Tire Co. on the Pacific coast. He is eminently qualified for the duties of his new position, having had practical experience in establishing the business of the Gates Tire Co. in this section of the country.

President Louis Grow, of the United Motors of New England, was given a dinner recently at the Hotel Victoria, Boston, by his associates in the trade. George R. Green, on behalf of those present, tendered Mr. Grow a substantial gift. President Samuel Grow, of the Grow Tire Co., gave an interesting talk on the tire situation.

Joseph F. Dineen, for several years publicity manager of the Boston branch of The B. F. Goodrich Rubber Co., has been appointed executive secretary of the Motor Truck Club of Massachusetts, with headquarters at 1 Beacon street, Boston. He will have charge of a monthly magazine that will be sent out to truck owners in Massachusetts and also represent the club at all legislative and municipal hearings. Mr. Dineen is well fitted for this work, owing to his previous connection with the Goodrich company, where he edited their house organ *Pep*, and also his several years' experience with the automobile department of one of the Boston newspapers.

Guy Niles, of the Boston branch of the Lee Tire & Rubber Co., recently announced that as a result of the decrease in prices for Lee tires, sales have advanced more than 400 per cent. More than 30 local dealers were added to the Boston agency within two weeks.

Walter Martin, secretary and purchasing agent of Everlastik, Inc., Boston, together with his father, returned recently from a two-months' vacation trip in England.

MISCELLANEOUS MASSACHUSETTS NOTES

W. B. Laighton, of the Hood Rubber Co., Watertown, who left for the Far East the middle of last August, is expected to land in Seattle about December 15. His trip was for the purpose of studying conditions in Japan, China, the Philippines, Singapore, India, Siberia, Manchuria and Hawaii.

The Avon Sole Co., Avon, has begun production on a large scale of a waterproof rubber slip to take the place of the rawhide slips which are often put in shoes to make them waterproof. Many firms are now using this new method of waterproofing their winter shoes. The new slip is economical and serviceable, giving the shoe resiliency and a beautiful finish to the edge of the sole. The material is supplied in both the white and tan shades and is made up into blocks, if manufacturers so prefer it, and can be shaved to any thickness desired.

Frederic C. Hood, treasurer of the Hood Rubber Co., Watertown; William H. Gleason, former treasurer of the Revere Rubber Co., Chelsea; Richard H. Rice, manager of the General Electric Co., West Lynn, and Edward F. Green, treasurer of the Crompton & Knowles Loom Works, Worcester, were among the prominent business men elected to the executive committee of The Associated Industries of Massachusetts at its annual meeting October 28.

R. S. Quinby, manager of the service department of the Hood Rubber Co., Watertown, read a very interesting paper on group insurance at the recent annual meeting of the Associated Industries of Massachusetts, outlining the plan which became effective with his company on January 1, 1919.

The English classes for employes of the Boston Woven Hose & Rubber Co., Cambridge, were resumed just after Columbus Day in a new class-room especially equipped for the purpose. Classes are held from 4.30 to 5.30 in the afternoon, the company paying for half an hour's time and the employes standing the other half.

The company's new restaurant for employes, opened early in September, is now serving a substantial wholesome luncheon to about three hundred persons daily at prices which merely cover the cost of materials and service.

An interesting new system of payment is being tried out in the employes' restaurant of the Converse Rubber Shoe Co., Malden. Instead of cash payments, as formerly, 50-cent and $2 tickets are obtained on a slip signed by department foremen, the amount being deducted from the week's pay.

The Converse Benefit Association opened its winter season of social activities at Mystic Theatre on the evening of October 24 with a motion picture and vaudeville show in which the amateur theatrical talent of the factory rivaled that of professional performers. The event was in the nature of a reception to new members.

A suggestion system has been put into effect in the factory of The Fisk Rubber Co., Chicopee Falls. Those with ideas for changes and improvements are asked to write them on special blanks, seal, and deposit them in the box provided for this purpose. They will then be collected and passed upon by a committee. Good ideas which have a money value will be rewarded with cash. Foremen and others whose duties are maintaining and improving efficient shop practice are not allowed to participate.

The Fisk Rubber Co., Chicopee Falls, has employed a specialist to examine the eyes of employes, not only for accidents, but for glasses. He will make the same thorough examination that he does in his private practice and will also see that glasses are fitted properly. For this examination the charge will be $1.50, which is $3.50 less than the regular fee. The company is to bear this difference in expense. Arrangements are also made so that the glasses can be purchased at a 10 per cent reduction.

The general safety committee of the Tyer Rubber Co., Andover, Massachusetts, is arranging for a series of moving pictures dealing with safety subjects. Excellent results are being accomplished by the company's new organization for safety, and although the mills of the company have always been remarkably free from accident, there has been a noticeable improvement in safety conditions, owing to the careful inspection by the workmen's commit-

tee, and the prompt attention by the general committee.

The Tyer Rubber Mutual Relief Association, an insurance organization by and for the employes of the Tyer Rubber Co., Andover, Massachusetts, is nearing the completion of its most successful year, the treasurer reporting a large surplus. Because of the amount of available funds and the increasing interest among the employes, it is proposed to raise the amount of the death benefit.

To expedite the reading of the more important trade and business magazines and publications, the foremen and executives of the Tyer Rubber Co., Andover, Massachusetts, have been arranged in groups which will receive the various publications in rotation. This movement is in line with that of many other business organizations which realize the value to employes of a knowledge of general trade conditions.

ACTIVE HEAD OF THE TYER RUBBER CO.

FREDERICK H. JONES, treasurer and general manager of the Tyer Rubber Co., Andover, Massachusetts, has the unique record of thirty-six years' continuous service with this company. Born in Andover, Massachusetts, September 28, 1867, he secured his early education at the public schools in that town. At the age of seventeen he entered the employ of the Tyer Rubber Co. as office clerk, and so well did he apply himself, that he was successively advanced to the positions of bookkeeper, salesman, sales manager and then to the executive positions which he now holds.

FREDERICK H. JONES

Mr. Jones is interested in numerous other enterprises, being at the present time a director in the Andover National Bank, Merrimack Mutual Fire Insurance Co., Cambridge Mutual Fire Insurance Co., Andover Press, Hamilton Emery & Corundum Co., Mechanical Rubber Manufacturing Co. and Tyer Rubber Co. Also he is a trustee of the Andover Savings Bank.

In addition to his many business interests Mr. Jones finds time to devote to agriculture, and he has a farm in Andover, a few miles from his residence. He also has an all-year home in Higganum, Connecticut, where he spends many week-ends. His favorite sports are golf, fishing and mountain climbing.

Mr. Jones is a member of several commercial associations, clubs and fraternal organizations, including The Rubber Association of America, Boston Chamber of Commerce, Automobile Association, Meadow Brook Golf Club, Belmont Spring Country Club, North Andover Country Club, Merrimack Valley Country Club, Wild Goose Club, Harmony Club, Maine Club, Boston City Club, Middlesex Club and Masonic lodges.

THE RUBBER TRADE IN RHODE ISLAND

By Our Regular Correspondent

THE PROSPECTS for the next few months among the plants manufacturing rubber goods in Rhode Island are far from encouraging, according to the reports received during the last fortnight or so. Not only have several of the largest textile concerns that manufacture fabrics for tires materially curtailed their production, but the plants of subsidiary concerns of the United States Rubber Co. have also gone on short time schedules. This curtailment by these large manufacturing establishments affects the entire industrial interests of the State and already the effects of even partial closing of these mills are being keenly felt by hundreds of operatives and their families.

According to officials of the National India Rubber Co., at Bristol, Rhode Island, curtailment of production at the big plant will be necessary for the remainder of the year. The curtailment is said to be due to the lack of orders in both the wire and shoe divisions, and will affect more than 4,600 employes, 600 of whom are in the wire division. George E. Shaw, superintendent of production of the wire division, stated early in the month in the *Keds Live Wire*, the factory newspaper that several departments in the wire division will work eight hours a day, five days a week. Beginning the first week in the month, all manufacturing and maintenance departments commenced on the five-day schedule, reducing to eight hours as fast as possible. The eight-hour feature, however, was not possible in the Keds division until after November 15. All manufacturing and maintenance departments were closed Thursday, Armistice Day, remaining closed until the following Monday. The plant was also closed the day before Thanksgiving, for the remainder of the week. This schedule, however, did not affect office clerks and factory clerks.

The wringer department of The American Wringer Co., Woonsocket, Rhode Island, was closed Saturday, November 20, to remain shut down until December 6. General business depressions and market conditions were held as responsible. While this department has not been running full, approximately 600 workers are affected at this time. The mechanical roll department is kept in operation. Announcement was made by the management that, due to the readjustment period which the country is facing at present, it had been found necessary to reduce the wholesale prices on the product of the company, and it is felt that this may result in better conditions and bring about more orders for wringers and thus improve conditions.

The James P. Allen Co., Inc., engaged in the manufacture of elastic braids at 90 Bayley street, Pautucket, Rhode Island, is removing to Dixfield, Maine, where a new factory has been erected for the use of the concern. The new plant will employ from 75 to 100 persons.

Employes of the Tubular Woven Fabric Co. dedicated the new mill addition to the company's plant on Pawtucket avenue, Pawtucket, Rhode Island, on the night of October 29, with a Hallowe'en costume party. There was a grand march at 9.30 o'clock and a distribution of prizes to the dancers appearing in costumes. The new addition was brilliantly illuminated for the occasion and the interior decorations were in keeping with the harvest season.

PROVIDENCE NOTES

The United States Rubber Co. has just purchased a small tract of land on the southerly side of Sprague street, Providence, containing approximately 10,000 square feet of land. This is adjacent to the property of the Mechanical Fabric Co.

The Davol Rubber Co. Mutual Benefit Association held its second annual dance on Friday evening, November 19, at the Girls' City Club, Providence, an orchestra providing the music. The affair, which was well attended, was in charge of a committee consisting of L. P. Williams as floor director, Allan D. McQuarrie as assistant, and Frederick Keenan, Thomas Ryan, Alfred Goff, Frederick Leach, Miss Nellie Ward, Miss Annie Reilly, Miss Annie Keegan and James Shea.

A new fife and drum corps has been organized from among the employes at the plant of the National India Rubber Co., Bristol, Rhode Island.

Aager H. Bense, for ten years general storekeeper at the factory of the National India Rubber Co., has accepted a position with the O'Bannon Corporation at West Barrington, Rhode Island.

In furtherance of its plan of extension and improvement the Revere Rubber Co. has commenced the erection of a one-story workshop of brick and concrete to front on Eagle street, Providence.

Goodrich Honors Twenty-Year Service Men

THIRTY-EIGHT veterans of The B. F. Goodrich Rubber Co. who have completed twenty years of service with the company were initiated into the Goodrich 20-Year Service Order at the Second Annual Veterans' Banquet and Entertainment held in Akron, October 26.

Gold service pins were presented to the veterans following the banquet, which was attended by company officials and the 175 Goodrich employes who last year became members of the honor order. The event was marked by addresses by W. O. Rutherford, one of the veterans who in two decades rose from a clerkship to vice-presidency, and by Bertram G. Work, president, and H. K. Raymond and C. B. Raymond, vice-presidents.

After the presentation of the medals, an all-Goodrich minstrel and musical entertainment was staged to show how the spirit of Goodrich honors its veterans. Percy W. Leavitt, a veteran of 40 years' service, was master of ceremonies. He is said to be the oldest active rubber worker in the United States.

In accepting the medals on behalf of the "new" 20-year veterans, Mr. Rutherford told of the progress which Goodrich had made during the last two decades, largely as a result of the loyalty of the old-timers. "In 1900," Mr. Rutherford said, "the Goodrich company had a capital of $3,000,000, its annual sales were about $5,000,000, its employes numbered 1,500, and it had seven stores. Compare that with today. Now the company is capitalized at more than $100,000,000, its sales last year were $141,000,000, and it has 108 branches and 88 foreign agents. We hope that when the members of this class lay down their responsibilities, equally great additional progress will have been made."

Interesting tales of the days when the Goodrich company was a "youngster" organization were told by H. K. Raymond. He kept all the old veterans chuckling over humorous reminiscences of the days when the company had only four or five small buildings, and everyone knew each other.

"More than 10 per cent of the people who were with Goodrich 20 years ago," Mr. Raymond said, "are still with us. That is almost a world's record. It speaks volumes both for the loyalty of the workers and the loyalty of the company. Loyalty is the most desirable trait in human nature. There is no question that much of the uncertainty of today is due to lack of confidence in the other fellow. When things are readjusted again, the true value of loyalty will be again evident."

Branch managers and representatives from Goodrich branches in all sections of the country attended the banquet and entertainment. Several of the veterans were unable to attend on account of now being stationed in foreign countries. Their medals, with congratulatory cablegrams, have been sent to them.

LEFT TO RIGHT: A. E. ROACH, WILLIAM ZEITLER, J. GILHOOLEY, W. O. RUTHERFORD, GEORGE SCHWALBACH, EARL HANNA, O. LEEMASTER, H. F. GUDEHUS, JOE GLATTHAR.

LEFT TO RIGHT: C. H. SMITH, CHICAGO; J. A. WRIGHT, H. E. BOYER, J. A. KUNKLER, H. J. ZIMMERMAN; E. E. LEACH, BOSTON; H. F. BURGNER, C. E. KITTINGER, H. A. BAUMAN.

LEFT TO RIGHT: G. A. MEALY, W. D. HOLLAND, W. S. GROVE, HARRY COPE, JOSEPH SAWYER; O. K. BUTLER, YOKOHAMA; W. C. LAKE, WILLIAM TOHEY, J. SHOEMAKER.

LEFT TO RIGHT: O. T. SCHWARTZ, F. F. CHRISTENSEN, A. F. WALDMAN, C. S. LONSBURY, F. E. BLOWER, DENNIS PHELPS, HERBERT PLANT, JOHN SAWYER, T. W. CULLEY, CHARLES WILSON.

THE RUBBER TRADE IN OHIO

By Our Regular Correspondent

AKRON NOTES

THE WEEK ended November 14 will be held memorable in the annals of finances and industry in Akron, the rubber center of the world. During the week the reduction of tire prices started, and within three days had run its limit, The Goodyear Tire & Rubber Co. announced its financial readjustment plan and within two hours of this announcement for the first time in its history passed a dividend upon the common stock.

The first factory to reduce tire prices was The Mason Tire & Rubber Co. of Kent, which announced early in the week that a cut of 12½ per cent would become effective immediately.

Two days later, while officials of The B. F. Goodrich Co. were in New York discussing the reduction of tire prices, The Goodyear Tire & Rubber Co. made public a new scale of prices in which a reduction of 3 to 14 per cent was apparent. The Miller Rubber Co. announcement came at 5 o'clock in the afternoon and The B. F. Goodrich Co. made public its new prices showing an average decrease approximating 12 to 13 per cent shortly after 8 o'clock the same evening.

Although up to the time of writing the smaller companies have not announced decreases, it is well understood that most of them have prepared a number of price lists and the ones coming closest to the prices of the larger companies will be given out to the public within a few days.

The long looked for decrease is at hand and it is now only a matter of a few weeks until the industry will know definitely if the public has been refusing to purchase tires until the prices decreased or if motorists will persist in putting their cars up for the winter.

Reports received from every section of the country show that many motorists are running upon tires which are usually discarded and that many of them are without spares. If this is the case it would not be surprising to find the so-called large surplus of tires wiped out by the public within a few weeks. According to figures given out by George M. Stadelman of The Goodyear Tire & Rubber Co., only one surplus tire is on the market for every automobile in the country. If tire users have been holding off for lower prices they will be able to take up this surplus very quickly and leave the market ready to take on tires now being manufactured.

The passing of the dividend on common stock is looked upon generally as a wise move on the part of the Goodyear directors. In the formal letter which carried the announcement the directors stated that the action was taken to conserve the company's cash reserves.

Although it naturally hurts the pride of successful industrial heads to be compelled to pass dividends, the action of the Goodyear directors is generally looked upon as the best possible step, because actual cash is very difficult to obtain at present and the payment of the dividend would have taken $1,500,000 from the company's cash reserves. This money can be used to better advantage in the business at this time and therefore Akron bankers generally look upon the move with favor.

The refinancing of the Goodyear company, which gives $25,000,000 new credits, became public through a letter written to the sales department by L. C. Rockhill, general sales manager, in which the men are urged to redouble their efforts to get business.

The inventories of the completed goods of the company have been assigned by the company to the bankers furnishing the loan, and in this way the plant is left unencumbered and the management remains in the present hands.

Upon the same day the Goodyear dividend action was published, officials of the International Harvester Co. announced that steps will be taken immediately to increase at least 20 per cent the output of the Akron factories, producing motor trucks chiefly.

If development for future business and for a greater population can be looked upon as showing the confidence of the inhabitants of Akron in the stability of the rubber industry, regardless of the thousands of rumors which have emanated from the city during the past four months, then the verdict is "the future of the business is good."

The people of Akron were asked at the last election to pass upon a $2,000,000 bond issue to provide much needed parks; also a bond issue to provide an elaborate approach to a $2,000,000 viaduct through the heart of the city.

The issue was clear cut. If Akron is not to grow in the future, there is no need of providing parks for increasing population and the approach now contemplated, for the bridge will be adequate. The voters clearly understood the problem and approved both bond issues.

No other interpretation was placed upon this verdict by Akron business men than that the rank and file of Akron people look with equanimity on the future of the industry, especially in view of the election having restored a large measure of confidence throughout the country.

The past year was the greatest year in the rubber industry here. Reports from factory heads indicate that the business of the Firestone Tire & Rubber Co. will amount to approximately $107,000,000, which is an increase of $16,000,000 over the $91,000,000 sales record of last year.

The Miller Rubber Co. will do more than $31,000,000, as compared with $27,000,000 last year, and The B. F. Goodrich Co., with two months' business to be heard from, has unofficially stated that the business thus far this year exceeds the $140,000,000 of last year.

The figures for The Goodyear Tire & Rubber Co., showing an annual business of $205,000,000, an increase of $38,000,000 over last year, have been officially announced. Thus the four large industries have a good foundation upon which to start the coming year.

Reports regarding annual sales from the smaller plants are not available, but they have had all the advantage of the drop in fabric and crude rubber prices and their business should show a larger percentage of gain over last year and their net profits should be larger proportionately than that of the larger companies, because their inventory shrinkage will be smaller.

Some of the larger companies were caught with large supplies of raw material on their hands when the bottom dropped out of the material market, and this will be reflected in their inventory reports. The smaller companies, as a rule, did not have the money to make long-term contracts and were unable to buy up large supplies, with the result that they were able to go into the open market and purchase cheaper material.

That the industries of Akron, including the rubber companies, have done more business during the twelve months ended November 1 than during any previous year, was shown when officials of the Chamber of Commerce announced at the annual dinner and meeting, November 18, that the annual survey of the Chamber showed total sales for Akron industries of $599,240,268, as compared with $522,436,021 during the previous twelve months.

The figures gathered annually by the Chamber at present include figures from fourteen rubber factories whose sales for the present year have increased from $427,341,611 in 1918-1919 to $545,812,311 for the present year.

The pay-rolls of the Akron industries during the year amounted to $143,330,572, as compared with $117,974,891 during the previous year. The survey showed that an average of 72,397 men and women were employed in Akron during the year, as compared with 79,000 November 1, 1919.

Reports to the Chamber show that the banks cleared during the year $589,721,000; that $24,301,613 worth of building permits were issued, including 4,621 homes valued at $6,312,354; that the post office receipts amounted to $1,195,380, and bank deposits totaled $72,165,195.

The Goodyear tire plant has resumed work on a five-day-a-week basis, producing 10,500 tires and 13,500 tubes a day. The plant will be closed for one week between Christmas and New Year's.

Lucien King, advertising manager of The Goodyear Tire & Rubber Co., upon his return from an extended trip through Europe, said he believed that the Old World will become a great market for manufactured rubber products, especially tires, within the next few years. Germany, although at present still suffering from the results of the war, will become a good market as soon as she recovers, he said.

The Home Owners' Investment Co., formed by Akron rubber and business men about two years ago to build homes for workingmen who had only a lot and 10 per cent of the total cost of a home, has completed 406 homes and will complete its first program of 456 before the end of the year. Harvey S. Firestone, president of the Firestone Tire & Rubber Co., is president of the company. Although originally $5,000,000 capital stock was authorized, only $2,100,000 has been issued. In the future the company will invest payments upon outstanding mortgages and interest upon these in building additional homes. The present financial stringency has not affected the company's activities.

The drive for funds for the Better Akron Federation, which finances 22 Akron welfare agencies, will conduct its annual campaign the first four days in December, according to T. E. Smith, editor of the *India Rubber Review*, president. The goal this year will be $550,000, as compared with $1,500,000 last year. Last year's budget included building funds which will not be included this year.

E. C. Vermillion, for the past year director of Americanization for the Board of Education, Akron, and previously director of Americanization for the Firestone Tire & Rubber Co., has resigned to take a similar position in Pittsburgh, Pennsylvania. He was tendered a public reception November 15 at which many of Akron's prominent rubber men were present.

W. O. Rutherford, vice-president in charge of sales of The B. F. Goodrich Rubber Co., is one of the youngest officials in the rubber industry, and at the same time one of the oldest in point of service. He registered in the last draft during the war and is still on the "near-side" of the fifty-year mark.

As proof of his extended work in the rubber industry, Mr. Rutherford now proudly wears a Goodrich 20-year service pin. He completed his twentieth year this fall and was initiated into the Goodrich 20-year-Service Order with thirty-eight other "new" 20-year veterans.

AKRON RUBBER MOLD & MACHINE CO.'S NEW ADDITION

Mr. Rutherford worked up to his present position from the ranks, winning each promotion through sheer ability. He entered the company's employ in 1900 in a minor position in the sales department.

Arthur W. Doyle, secretary of the Doyle Tire & Rubber Co., Akron, was elected to the office of prosecuting attorney by 39,558 Summit County Republicans in the recent election, a majority vote exceeding that of his opponent by nearly 12,000.

AKRON RUBBER MOLD & MACHINE CO. EXPANDS

The accompanying illustration shows part of the new addition now being erected at the plant of The Akron Rubber Mold & Machine Co., Akron, Ohio. Ground was broken for this extension about six months ago and the work has progressed steadily ever since. These additional quarters, with the installation of new machinery, will approximately double the present facilities of the company, which already cover more than 75,000 square feet of floor space.

A CORNER OF THE AKRON RUBBER MOLD & MACHINE CO.'S PLANT

The new building will be of the most approved fireproof construction throughout, built of brick and tile, with sawtooth roof, giving ample light in all parts of the structure. A new power house has also been built for heating the new plant, and as an auxiliary to the heating system of the present plant, hot water boilers of highest efficiency being installed.

The other illustration is a view of the machine shop of the Akron Rubber Mold & Machine Co. that was taken during the middle of last October, which is significant, as its reflects a production condition not popularly supposed to have prevailed in the tire equipment business at this particular period. The company numbers among its patrons a great many of the largest rubber manufacturing concerns in this country and Canada, and its slogan, "Built right for right building," is known to the tire manufacturer everywhere.

MISCELLANEOUS OHIO NOTES

New officials at The Mason Tire & Rubber Co.'s plant, Kent, Ohio, include E. H. Gorsuch, formerly with the Firestone Tire & Rubber Co., who has been appointed chief chemist to succeed James H. McGachan, and I. C. Monroe, appointed assistant superintendent.

The advertising account of The Victor Rubber Co., Springfield, Ohio, has recently been taken over by The Akron Advertising Agency Co. The present extensive advertising campaign of the Victor company will be continued along new and original lines, which are confidently expected to attract nation-wide attention.

Charles S. Spies, for some time in charge of the Philadelphia office of The Faultless Rubber Co., of Akron, Ohio, has severed his connection with that company and is now vice-president and sales manager of The Toycraft Rubber Co., Ashland, Ohio, which specializes exclusively in toy balloons for the trade and for advertising purposes.

J. D. Flanagan, formerly in charge of the development of tires, tubes and accessories of the Firestone Tire & Rubber Co., has resigned to accept the position of superintendent of The Rotary Tire & Rubber Co., Zanesville, Ohio, succeeding William Sherbondy, resigned.

The Thor Tire & Rubber Co., Willoughby, Ohio, has erected a building 200 by 35 feet in dimension to accommodate its rubber heel and mechanical department, and has started production.

CLEVELAND NOTES

The McElrath Tire & Rubber Co., Cleveland, Ohio, recently raised its capitalization from $515,000 to $3,500,000. The plant, which is operated entirely by stockholders, expects to go into production about March 1, 1921, manufacturing "Track-Tread" cord tires.

At a recent annual meeting, The Owen Tire & Rubber Co., Cleveland, Ohio, elected as directors O. M. Dickison, W. J. Owen, W. R. Green and J. S. Green. Besides these directors, the present officers of the company are W. C. Owen, president; E. M. Blatz, vice-president, and W. I. Creese, secretary-treasurer.

THE RUBBER TRADE IN THE MID-WEST

THE MID-WEST MANUFACTURERS' ASSOCIATION

THE November meeting of The Mid-West Rubber Manufacturers' Association was held at the Chicago Athletic Association, November 9 and was attended by 40 members. After luncheon, brief remarks were made by a number of those present, including: Walter B. Denman, Denman-Myers Cord Tire Co., Cleveland, Ohio; J. O. Schulze, Mississippi Valley Rubber Co., Iowa City, Iowa; W. E. Wilson, Akron Rubber Mold & Machine Co., Akron, Ohio; V. E. Gustafson, Cleveland, western representative, Taylor, Armitage & Eagles, Inc., and the Hunter Manufacturing & Commission Co., New York City; R. T. Conant, Brighton Mills, Passaic Co., New Jersey; P. H. Ober, Mansfield Tire & Rubber Co., Mansfield, Ohio; Edward S. Babcox, *The India Rubber Review,* Akron, Ohio; Edward F. Pfaff, *The India Rubber World,* New York City; Scott Kingwill, western representative, *Tires,* New York City, and J. B. Miller, Brunswick-Balke-Collender Co., Chicago, Illinois.

The following new members were elected:

REGULAR MEMBERS: Denman-Myers Cord Tire Co., Cleveland, Ohio; Mississippi Valley Rubber Co., Iowa City, Iowa.

ASSOCIATE MEMBERS: Taylor, Armitage & Eagles, Inc., New York City; The Trade Press Co., publisher of *Rubber,* Cleveland, Ohio.

President J. T. Christie announced that the second annual meeting and banquet of the Association would be held on December 14, at a place to be announced later, and appointed the following committee to make the necessary arrangements and provide entertainment: W. H. Stillwell, chairman, Allen Machine Company, Erie, Pennsylvania; W. E. Wilson, Akron Rubber Mold & Machine Co., Akron, Ohio; T. J. Carroll, Brunswick-Balke-Collender Co., 623 South Wabash avenue, Chicago, Illinois; P. P. Parker, Parker Tire & Rubber Co., Indianapolis, Indiana; A. C. Eide, American Zinc, Lead & Smelting Co., 111 West Washington street, Chicago, Illinois; J. B. Longini, Pittsburgh Valve Foundry & Construction Co., Chicago, Illinois; H. S. Vorhis, secretary, Mid-West Rubber Manufacturers' Association, 332 South Michigan avenue, Chicago, Illinois.

MISCELLANEOUS MID-WESTERN NOTES

Announcement is made of a change in the corporate name of Stresen-Reuter & Hancock, Inc., Chicago, Illinois, dealer in colors, minerals and chemicals, which will be known in future as Stresen-Reuter & Biser, Inc. The change in name does not indicate change in personnel and the past policies of the company will be adhered to. The old officers remain, as follows: F. A. Stresen-Reuter, president; A. S. Proctor, vice-president; J. L. Biser, secretary and treasurer. The company has renewed its foreign connections and will import high grade lake colors.

The Monsanto Chemical Works, St. Louis, Missouri, has established a branch office in the Marine Building, 209 North La Salle street, Chicago, Illinois, with W. L. Filmer in charge, where a complete stock of the company's products is carried.

The Morse Chain Co. has opened a plant in Detroit to manufacture sprockets for front end drives, including the Morse adjustment. The company will continue to manufacture chains and power transmissions at its main plant at Ithaca, New York. The Detroit plant will be under the general management of F. C. Thompson, with F. M. Hawley as chief engineer and C. B. Mitchell as factory manager. The sales and engineering offices are located at the new plant, corner 8th and Abbott streets, Detroit.

R. R. Hayward has recently been promoted to general sales manager for the Premier Rubber & Insulation Co., Dayton, Ohio, with headquarters in Detroit, Michigan.

The annual stockholders' meeting of The Wildman Rubber Co., Detroit, Michigan, was held at Lansing, Michigan, November 8, 1920. Officers and directors for the coming year were elected as follows: W. W. Wildman, president and general manager; L. C. MacGregor, vice-president; J. C. McCabe, secretary; C. R. Twynham, treasurer. The directorate includes W. W. Wildman and L. C. MacGregor, both of Detroit; H. P. Orr, Lansing; J. C. McCabe, Bay City; and C. R. Twynham, Akron, Ohio. Work on the new million-dollar plant at Bay City, Michigan, is progressing in a satisfactory manner and a contract has been let for the main building, which is to be 165 by 365 feet, three stories and basement, of reinforced concrete.

Zwebell Brothers Co., Milwaukee, Wisconsin, manufacturer of high pressure retreading molds, sectional molds, rubber products and accessories, has increased its capital from $15,000 to $300,000 to provide for expansion and take care of the growing demand for its tire repair equipment. The company is erecting a machine shop 60 by 100 feet at Schleisingerville, near Milwaukee, which will be used for the manufacture of tire repair machinery.

The She-boy Rubber Co., Milwaukee, Wisconsin, has been capitalized at $675,000 and expects to be in operation by March 1, 1921, manufacturing rubber belting, rubber knee pads, automobile tubes, automobile inner tires, rubber boots and shoes with wooden soles. Officers are Leo Hofmeister, president and general manager; E. A. Hickey, secretary and office manager; Corty M. Halderson, treasurer and financial manager; Dr. Daniel F. Nauth, vice-president. The directorate includes Dr. A. W. Sieker, William Eickhoff, Robert Bellin, E. J. Larson, Alfred Halderson, Albert Suemnicht, and B. Brennan. The company has selected a factory site in Sheboygan, Michigan, where a plant is now in process of erection. The executive offices are at 176-182 Sixteenth street, Milwaukee.

The Jefferson Rubber Co., Jefferson, Wisconsin, was incorporated October 1, 1920, with a capitalization of $303,000, to manufacture a highly specialized line of rubber products in addition to a specially constructed 30 by 3½-inch cord and fabric tire and a general line of tubes. Directors of the company are: R. W. Lyons, C. R. Girton, William E. Taube, W. S. Henry, and W. F. Copeland. Its officers are R. W. Lyons, president; C. R. Girton, vice-president; William E. Taube, secretary; W. S. Henry, treasurer. Mr. Lyons was formerly connected with The B. F. Goodrich Co., and the Firestone Tire & Rubber Co., Akron, Ohio, and the Gates Rubber Co., Denver, Colorado. Mr. Girton and Mr. Taube were also connected with the Gates Rubber Co. The Jefferson Rubber Co. has a factory site of fifteen acres in Jefferson, Wisconsin, and has begun surveying for the first unit of the buildings. It is expected that the plant will be finished and in operation by April 1, 1921.

The Kansas City, Missouri, branch of the Rubber Corporation of America has removed from 21st street and Grand avenue to larger quarters at 717-719 Wyandotte street. The Rubber Corporation of America is a consolidation of the sales and selling organizations of the Sterling Tire Corporation, Rutherford, and the Empire Rubber & Tire Corporation, Trenton, both in New Jersey, the two manufacturing companies remaining separate and distinct.

An appointment of interest to the rubber industry is that of V. E. Gustafson as direct sales representative covering the Middle West for the products of the mills controlled by Taylor, Armitage & Eagles, Inc., and the Hunter Manufacturing & Commission Co., both of New York City.

V. E. GUSTAFSON

Mr. Gustafson is well known in the motor and accessories industry, as he has been associated with the Firestone Tire & Rubber Co., Akron, as purchasing agent. Previous to this connection he was for many years secretary and sales manager of the Woods Motor Vehicle Co., Chicago. He will represent Taylor, Armitage & Eagles, Inc., in the sale of tire fabrics and the Hunter Manufacturing & Commission Co. in the sale of sheetings, drills, Osnaburgs, and kindred fabrics used in the rubber industry.

Mr. Gustafson's pleasant manner and agreeable personality have gained him a host of friends who predict success for him in his important new connections.

Sales representatives of the International India Rubber Corporation, South Bend, Indiana, recently appointed, include H. D. Brown, who will cover part of Kansas, Oklahoma, Missouri, and Arkansas, with headquarters at Wichita, Kansas; E. A. Bradley, whose headquarters are at Lincoln, Nebraska, and whose territory embraces Northern Kansas, all of Nebraska and Western Iowa, as well as a part of Missouri; Ray L. Hause, who has been appointed sales representative to cover Northern Illinois and the state of Wisconsin; and C. H. Fischer, who has been with the company for some time and will continue to have headquarters in Chicago and cover Michigan, Northern Ohio, Western Pennsylvania and Western New York.

R. J. Fitzgerald, for some time special sales representative of the International company, has been appointed assistant sales manager, succeeding C. H. Mayer, resigned. Mr. Fitzgerald was at one time district sales manager for The McGraw Tire & Rubber Co., Indianapolis, Indiana.

The board of directors of the Haywood Tire & Equipment Co., Indianapolis, Indiana, has increased the capitalization to $400,000, and has authorized the sale of $100,000 worth of common stock. This capital will be used to establish Haywood schools of tire surgery in all sections of the country, these schools being also agencies for the sale of Haywood equipment.

The Marysville, Michigan, plant of the Athol Manufacturing Co., operating as a branch of the Massachusetts factory, exemplifies the most modern ideas of factory buildings and machine layout and ideal working conditions are said to be provided. C. J. Strobel is superintendent; T. G. Ralph, plant engineer; Leslie Moulton, office manager; and H. H. Upton, production and cost man.

THE MANUFACTURER OF THE "EVERYCHILD" RUBBER WADING bloomers described in our issue of August 1, is introducing the "Everychild" baby pants, of sheet rubber vulcanized in one piece, without stitching, strings, pins, or buttons.—Arthur Frankenstein & Co., 514 Broadway, New York City.

THE RUBBER TRADE ON THE PACIFIC COAST

By Our Regular Correspondent

LOS ANGELES NOTES

THE temporary slowing up in the rubber trade throughout the country has, perhaps, been remarked less on the Pacific slope than anywhere else. None of the mills just now is attempting peak production, but all are reported busy and employing practically their full complement of workers. The mild weather on the Coast and the presence of an unusual number of tourists, especially in Southern California, have tended to keep up sales of automobile tires, which have slackened elsewhere. A good, steady demand for mechanical rubber goods is reported from the dealers in the chief cities, and prices are well maintained.

The coast manufacturers rather welcomed than opposed the recent increase in transcontinental freight rates, as in some cases it has acted as a protection against competition from the East and Mid-West. On the other hand shipping interests are, with some success, prevailing upon many manufacturers on the Atlantic coast to ignore the $6.55 rail rate and take the $3 rate from New York and other eastern points via the Panama Canal to Los Angeles in approximately eighteen days. Pacific Coast rubber manufacturers are not disconcerted by this situation. They say that they will easily meet any competition, and just now labor conditions are very favorable owing to the influx of workmen from other parts of the country where industries have slowed up. These workmen usually prefer to work for less on the Pacific coast than elsewhere because of the more generally favorable climate.

Ground has been broken for the Pacific Coast plant of the United States Compression Inner Tube Co., of Tulsa, Oklahoma, on its 12½-acre site in Burbank, Los Angeles County, California. The first spadeful of earth was turned by W. A. Blanchard, mayor of Burbank. Many representative business men of Southern California witnessed the ceremony, as also A. J. Pennington, general factory manager; C. R. Privett, Pacific Coast distributor; and J. F. Scanlon, advertising manager. Mr. Pennington has just completed a factory for the company at Kittanning, Pennsylvania. The parent plant is at Tulsa, Oklahoma. Puncture-proof inner tubes will be made exclusively at the Burbank plant.

Good headway is being made in the erection of the plant of the West Coast Asbestos Co. at Downey, California. The concern, which is a subsidiary of the E. M. Smith Rubber Co., of Los Angeles, will make rubber-asbestos articles and specialize in heavy oil and fire hose.

The Goodyear Tire & Rubber Company of California, Los Angeles, has curtailed production to 1,800 tires a day and the operating staff has been reduced to 2,000. The pay-roll runs over $50,000 a week, and two shifts are worked daily. Last month the cost of tire production was 8 per cent less in Los Angeles than in Akron. It is believed that the report recently circulated that the company was in financial difficulty was put out by stock-jobbers to frighten some of the several thousand stockholders in the southern California metropolis into parting with their shares at bargain prices. Very little stock was dislodged, it is said, although the quotation was forced down to about $80.

A concern to be known as Edward Harris, Inc., has been organized with offices at 1243 South Olive street, Los Angeles, to manufacture a full circle repair vulcanizer in which an air-bag is used. It is claimed that the vulcanizer does in 45 minutes work that ordinarily takes 3½ hours, and virtually increases the capacity of a shop four-fold. The concern, of which Mr. Harris is president, expects to have several hundred men at work in its new factory by January 1.

E. S. Firestone, branch manager of the Firestone Tire & Rubber Co., entertained the Los Angeles Firestone tire dealers recently at a banquet in the Los Angeles Athletic Club. Talks

were given by Mr. Firestone and his sales manager, Mr. Frieze. The get-together meeting was preliminary to the starting of an extensive advertising campaign.

A salesroom and warehouse, 100 by 135 feet, is being erected on the southwest corner of Los Angeles and Fourteenth streets, Los Angeles, for the Henry B. Day Co., wholesale dealers in cotton goods and rubberized fabrics used in the automobile industry. The building will cost nearly $100,000 and will be ready about January 1.

President Adolf Schleicher, of the Samson Tire & Rubber Co., Los Angeles, reports that the slowing down in the tire trade has not affected his concern, which will start running night shifts December 1. The company has 600 agencies selling its products between Tia Juana, Mexico, and Vancouver, British Columbia. It has recently enlarged its West Pico street office, and added a new machine shop, 40 by 80 feet, and another 120-h.p. steam unit at its factory.

SOUTHWESTERN NOTES

An attempt to ruin the cotton crop in at least part of southern California has been frustrated, according to J. P. Coy, horticultural commissioner of San Bernardino county, whose assistant, J. M. Peters, recently found three boll weevils in some cotton in a small box on the edge of a cotton plantation near Chino. It is believed by the commissioner that some one in the section indicated by the postmark, which is withheld by the authorities, jealous of the success of the California growers, had adopted this means for doing an astounding amount of damage to the cotton fields of California, thereby lessening the crop and advancing prices.

"Don't sell your cotton," is the urgent advice of the Arizona Cotton Growers' Association in a circular sent out to growers, who are told that an attempt is being made by strong interests to keep the price of the 1920 cotton crop at the lowest possible price for a long time to come. In order to finance those who need money the Association will arrange loans of $200 a bale. Growers are also advised to hold their cotton seed for more than $20 a ton, as it is worth more than that for fertilizing and is valuable as food for cattle.

Tucson, Arizona, bankers have agreed to finance the marketing of the Santa Cruz county cotton crop. All cotton handled by the bank will be shipped to Galveston, graded and stored, subject to selling orders from the planters.

The Texas Motor Car Association, Fort Worth, Texas, announces that construction on its Southland tire factory which was suspended during the war, has been resumed.

MISCELLANEOUS PACIFIC COAST NOTES

William E. Duersten, vice-president and general manager of the Lehigh Tire & Rubber Co., and John N. Mowe, general sales manager of the Kelly-Springfield Tire Co., have been recent visitors in San Francisco.

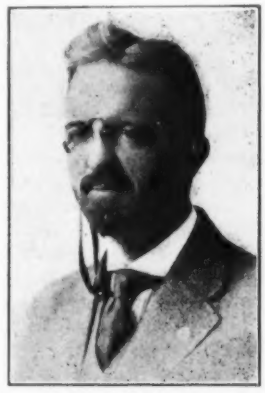
Ray Thurman has been appointed western representative in charge of sales of the International India Rubber Corporation, South Bend, Indiana, on the Pacific slope. Mr. Thurman is a successful newspaper advertising manager and acquired his knowledge of the automobile, motor truck and rubber business through his former connections with the Studebaker Corporation, the United States Motor Truck Co., and The McGraw Tire & Rubber Co.

The Douglas Brothers, who conduct a repair establishment known as "The Tire Surgeon" at Bremerton, Washington, have been appointed distributors of "Savage" tires.

THE MORATORIUM RECENTLY DECLARED IN CUBA HAS BROUGHT about a very grave situation. Ecuador, Colombia, Chile, Uruguay and the Argentine, in fact practically every other Latin-American country, with the possible exception of Mexico, is undergoing a financial crisis with a subsequent fall in exchange. American exporters should obtain reliable credit information before accepting orders from Latin-American countries at this time.

A WELL-KNOWN CANADIAN PUBLICITY MAN

RALPH W. ASHCROFT, formerly advertising manager of the United States Rubber Co., and now director of publicity of the Ames Holden McCready System, Montreal, Canada, is a man of varied experience and exceptional ability. Born in Cheshire, England, in 1875, he received his education in private schools and Waterloo College, Waterloo, England.



RALPH W. ASHCROFT

Graduating from college in 1889, he came to New York the following year to act as private secretary to a railway president, which position he held for five years. He then became interested in commercial journalism, export trade and advertising. In 1913 he joined the forces of the Canadian Consolidated Rubber Co., Limited, Montreal, as advertising manager, and did such excellent work that in 1916 he was put in charge of the advertising and publicity for the United States Rubber Co. and its allied companies, with headquarters in New York City. This position he held with distinction for four years, building up an efficient advertising department numbering some eighty persons.

Always a believer in Canada as a potentially self-contained industrial nation, Mr. Ashcroft was induced to resign his position with the United States Rubber Co. to take charge of the advertising and publicity of the Ames Holden McCready System. This organization includes Ames Holden McCready, Limited, manufacturers of leather footwear and jobbers of rubber, canvas and felt footwear; the Ames Holden Tire Co.; Ames Holden Felt Co.; Mount Royal Rubber Co.; Ames Holden Rubber Boot Co., and the Atlantic Sugar Refineries, Limited.

Mr. Ashcroft is a member of St. George's Society, The Rubber Association of America, Association of Canadian Advertisers, Inc., Canadian Manufacturers' Association, Montreal Publicity Association, Lotos Club, New York Athletic Club, Engineers' Club, Arts Club, Canadian Club, Montreal Club and Circumnavigators' Club.

CANADIAN NOTES

Recent changes in personnel of the Ames Holden McCready System, Montreal, Quebec, include the appointment of W. M. Angus as general sales manager. Mr. Angus has been identified with this company for many years and is well known to the trade, particularly in Quebec and the Maritime provinces. His offices will continue to be located at 1221 Mount Royal avenue, East, Montreal. J. P. Quesnal, formerly assistant manager, will succeed Mr. Angus as manager of the Quebec division, with offices at the same address.

George E. Black was recently appointed operating manager of H. H. Robertson Co., Limited, to succeed Charles McKenzie, who has been elected vice-president of the company. Mr. Black is a mechanical engineer and since his graduation from the University of Toronto has been engaged in important engineering work for the Ontario government.

THE *Board of Trade Journal*, LONDON, SEPTEMBER 16, 1920, sums up the extent of the rubber trade of the Federated Malay States in 1919 to be greater in quantity than any other year, though not the greatest value, 106,453 tons being exported, valued 189,079,236 Straits Settlements dollars (par value of dollar = $0.567 U. S. currency). The market for rubber was reported to be considerably more favorable in 1919 than in 1918, the fluctuation in prices being much less than in previous years.

THE WEAVER WHEEL ALINEMENT INDICATOR

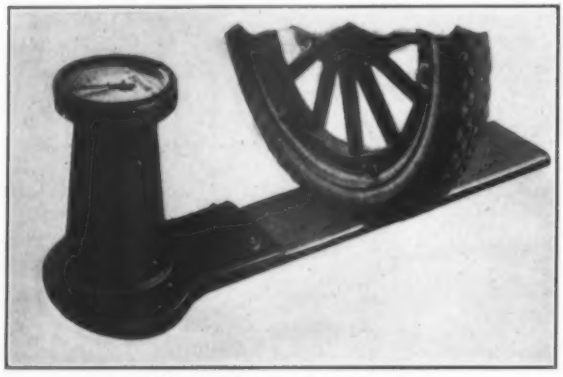
WHEN the wheels of an automobile are parallel, the wear on the tires is at a minimum since the wheels roll with no friction. Any deviation from this develops a side thrust, or "drag" on the tires that is very destructive. If, for example, the front wheels are out of true one inch, the tires must be dragged sideways three inches in every revolution. Figuring upon this basis, a 30-inch tire would be dragged sideways 168 feet in every mile that the car is driven.

Statistics show that from fifty to seventy-five per cent of the cars being driven today have their wheels out of alinement to a greater or lesser degree, causing needless wear of tires and costing the motoring public much money.

To show motorists and garage men easily and convincingly wheel conditions, the Weaver wheel alinement indicator has been created. This instrument will accurately record the misalinement of the wheels to the minutest fraction of an inch by simply driving one wheel of the car over it.

The instrument consists only of two flat steel plates with roller bearings between, the upper plate being accurately connected with a recording mechanism which registers the movement of the plate on the dial. With the portable type, the car owner can run his car slowly over the plate and a glance at the dial will show him the misalinement of the car wheels while the car is in motion or, in other words, the true running alinement which it has heretofore been absolutely impossible to record.

The larger or stationary type is designed for installing in the runway of the garage so that cars passing in or out will pass over it. This type is equipped with an electric bell which rings



WHEEL ALINEMENT DEVICE

if the wheels are out of alinement more than the minimum degree which the garage man chooses to establish. Ordinarily, it is considered that three-eighths of an inch misalinement is not serious and the alinement indicator can be set so that the bell will not ring unless the misalinement is more than this or any minimum which the garage man chooses to establish.—The Weaver Manufacturing Co., Springfield, Illinois.

THE AIR BAG PROBLEM

THE air bag possibly causes more trouble to the vulcanizer than any other article used in repair work. The average repairman does not stop to consider that the life of an air bag depends entirely upon how it is used, and consequently it is not given the proper attention and care. This makes it an impossibility to guarantee the air bag for any definite number of cures.

Before the air bag is used, remove the valve core and inject about one-half pint of water. This can be done by pressing the sides of the air bag together and inserting the stem in a tank or vessel of water, and releasing the pressure. This should be repeated about every ten cures, as the water generates steam, some of which escapes every time the air is released from the bag after a cure.

The water in the bag keeps the gum tube soft and flexible. It prevents checking and cracking on the inside, which cause a bag to leak.

It is advisable to have two sets of air bags of each size, one for straight side, and the other for clincher tires. The reason is obvious, as the contours of the two types of casings are entirely different. If the air bag is formed to the straight side tire and then used in a clincher type, it will have to change shape each time. This injures the tube and causes the bag to leak.

Another important detail is fitting the bag in the casing. The size given on the outside of the casing does not always determine the size of air bag used. This is especially applicable to cord tires. If the air bag is too small and the next size is too large, it is better to use a smaller bag and pad it to fill out the casing properly, using one, two or even four plies of fabric if necessary.

Pads can be made from pulled fabric, and can be used indefinitely. If the bag is too small and not padded to fit, it will expand beyond its limitations, breaking the fabric or causing it to blow out. This will cause a spongy or porous cure, and the patch on the tire will wear off prematurely. Padding the air bag to insure a perfect fitting is a very essential part of the operation, if good results are to be expected. The time consumed is more than compensated for by the additional number of cures obtained.

Another air bag abuse is forcing the bag in a casing too small for it. This will cause it to crush or pinch between the beads, breaking the gum tube inside and causing the bag to leak. A bag used in this manner has the appearance of being porous when tested.

Often the repairman forgets to deflate the bag before releasing the clamps. The consequence is a blow-out in the air bag. This is the result of carelessness on the part of the user and not of faulty construction.

Air bags should be inflated to a uniform pressure at all times. If you are using 60-pound pressure in a 3½-inch bag, continue to use the same pressure and depend upon the pads to assist by filling out the casing to proper capacity. If you inflate to an abnormal pressure, it will strain the fabric, causing it to crack and lessening the number of cures.

Always soapstone the interior of all casings before inserting the air bag, otherwise it will stick and to remove without twisting or buckling will be impossible. This will cause it to break at the parts affected.

Another suggestion that is important to the repairman is the inadvisability of leaving air bags in a flattened condition. All bags should be inflated after they are used. It is necessary to their longevity to retain their natural shape when not in use.

Sometimes the repairman adopts the habit of cooling the air bag by throwing it in water. This hardens it and will cause it to crack or break quickly.—*Miller Tire Trade News.*

"TIRE SAVE" AND "JIFOID"

"Tire Save" is a putty of about the consistency of bread dough, containing a high grade of Pará rubber in its composition, as well as chemicals that produce vulcanization with exposure to air. Patches applied with "Tire Save," it is claimed, become permanently vulcanized to the tube to which it is affixed.

"Jifoid" is a self-healing cement for plugging leaks and punctures in single tube bicycle tires, without the use of either patches or plugs. This cement is put up in both tubes and cans.

Both "Tire Save" and "Jifoid" are put out by the same manufacturer.—National Rubber & Specialties Co., Chickering avenue and C., H. & D. Railway, Cincinnati, Ohio.

The Rubber Trade in Great Britain

By Our Regular Correspondent

THE twice-adjourned coal strike finally materialized and occasioned a general upset. The outlook for the rubber trade, however, was by no means so serious as in other industries, where much larger quantities of coal are used. Electric power is now largely employed in rubber works, and, although the supply was reduced by most municipalities, there was no total cessation and work was carried on much as usual. The time taken for the strike to mature naturally gave firms an opportunity to look after their coal supplies, so most of the works had reserves which they utilized with care. Had the strike extended over a longer period, short time would no doubt have become general, but this is rather looked for, owing to the general slackness in the trade.

GERMAN COMPETITION

A matter which some firms are seriously taking to heart is the rejuvenation of German competition. Not only are Continental tires and packings of the Klingerite type again in our market, but there is plenty of evidence that overseas orders, which have been prominent in recent years, are being withheld owing to the attraction of German offers at lower prices. This is a matter which is by no means peculiar to the rubber trade and it is the inevitable outcome of reduced production at higher pay which now characterizes all our industries and which the exhortations of our politicians and leaders of industry have so far failed to remedy.

THE PROPOSED RUBBER CLUB

A meeting attended by about forty was held at the Queen's Hotel, Manchester, on October 8, to discuss this project. Mr. Brooking of the St. Helens Cable & Rubber Co., Limited, was in the chair. An important point brought out by the personnel of the attendance and the speeches was that so far the proposal had not received any active support from the leading manufactures with one or two exceptions. It appears that the India Rubber Manufacturers' Association imagines that the club, if formed, will become a focus of discussion of trade matters and thus poach on the preserves of this well established organization. Mr. Standring, honorable secretary pro tem., strongly combated this idea, the object of the club being, he said, to provide means for social intercourse, together with the discussion of matters relating to developments which affect the progress of the industry. There seemed to be a diversity of ideas among those present, both as to the object and the scope of the movement. While some favored the idea of a permanent club house, others pointed out that most existing clubs with large memberships had difficulty in paying their way and that the contingent expenses of such a club house would far exceed what would be reasonably expected from members' subscriptions, making a substantial subsidy from the big manufacturers an imperative necessity. At the moment there was no evidence that such generosity would be forthcoming. Other speakers who favored the idea of a club advocated meetings once a month or so in a hired room, in which case a moderate yearly subscription would cover all expenses. The chairman broached the question of the formation of a rubber institute on the lines of existing scientific and technical institutes, but the idea found little support and certainly the meeting as constituted could hardly be expected to deal intelligently at a moment's notice with a proposal of such novelty and magnitude. Speakers who said they always read with interest the reports of the proceedings of The Rubber Association of America in THE INDIA RUBBER WORLD expressed disappointment that no details of the constitution of the club were available for the meeting. The important matter as to who would or would not be eligible for membership was debated at some length, but no decision was reached. As it was obvious that there was among those present no general unanimity on the various points raised, it was decided to form a committee to consider the whole matter and make a report at a further meeting to be called when the result of the London meeting would also be known. A committee comprising the following six was therefore appointed and held its first meeting immediately after the luncheon: J. H. C. Brooking, Dr. Betteridge, H. W. Hatton, H. Hewlett, F. J. S. Gray, L. Minton and J. Walwork, with Mr. Standring as honorable secretary. The London meeting was held on October 13 at Anderton's Hotel, and a general discussion ensued on much the same lines as at Manchester. Mr. Standring, who presided, said that as far as anything had been decided, the intention was to have two centers, one at Manchester and one at London, with central control and meetings alternately at London and Manchester. It was emphasized by one speaker, as at Manchester, that if the club was to be a success it would be necessary to have the support of the leading manufacturers and he proposed that an expression of opinion should be sought from the India Rubber Manufacturers' Association. The meeting had an advantage over that at Manchester in hearing an account from H. H. Holland of the nature of the activities of The Rubber Association of America, whose hospitality he has enjoyed. In the event a provisional committee was appointed, consisting of Fordyce Jones, A. U. B. Ryall, Dr. P. Schidrowitz, A. B. Cooke, J. L. Lake, William Abbott and T. R. Buldock.

R. & J. DICK, LIMITED

In accordance with the present popular form of raising additional working capital this well-known firm of balata manufacturers has made an issue of £250,000 eight per cent seven-year notes at 97 per cent. The present company was incorporated in 1908 to take over the successful private company of the same name. The company owns a belting factory in the United States, and the boot department is carried on in numerous retail shops in the United Kingdom, as well as at the factories in Glasgow. As the assets of the company cover the principal of the loan over five times and the annual profits cover the interest over five times, the investment must be considered an attractive one by those who are in favor of such short term investments and do not anticipate a lower value for money in seven years' time..

THE INDIA RUBBER & TYRE CO.

This firm, which is located at Clower street, Salford, Manchester, makes a specialty of rubber solution which it supplies to a considerable number of firms in the Manchester district that send their cloths out to be proofed and do the making up into garments at their own factories. The making of rubber solutions, or rubber cement, as I believe it is called in America, is not at all commonly carried on as a special industry outside the rubber works proper and I do not remember having referred to it before in this correspondence. John Markus, the proprietor of the business, has the advantage of a life-long connection with the trade, having been manager of a proofing works at the early age of fifteen. Although the principal users of the rubber solution are the waterproof garment manufacturers, customers are also found in the bookmaking, millinery and hatting industries, the requirements as to composition and strength not being similar in all cases.

THE REVOLITE CO., LIMITED

This concern, situated at Cambridge street, Bradford road, Manchester, and mainly concerned with the manufacture of rubber heels and rubber composition soles, has been reconstituted

with a capital of £50,000 in 10-shilling shares. The directors are S. W. Copley, C. C. Webb and A. A. Crosier. Mr. Copley, who is a man of wealth, a short time ago bought the Ramsden estate, which covers a large part of the town of Huddersfield, from Sir James Ramsden, Baronet, for £1,300,000 and resold it to the corporation of the town, which is his native place, for the same sum. Mr. Copley has only quite recently taken any financial interest in the rubber heel business.

EXCHANGE DIFFICULTIES

Many orders are naturally being lost in this country and on the Continent generally by agents and representatives of American firms, owing to the high rate of exchange. This is a matter that cannot be righted in a day and it may possibly be a couple of years before normal conditions are restored. It seems to be the fact that American houses, when quoting British and Continental firms, oftener than not state prices in their own coinage, viz., dollars or cents, and leave either their agents or customers to take all the risk of the exchange going against them. This makes business almost impossible, particularly where the agent acts as a merchant, buying and paying for the goods he gets from the States. In many cases it means, especially if making Continental quotations, that he, the agent, is to take the risk of two rates of exchange, American and Continental. It is probably the case that much more business would result if quotations were made in the moneys of the country in which the goods were being sold, as it seems reasonably certain that manufacturers, particularly on the Continent, would rather pay a slightly higher price and have quotations in their own coinage, as it would put them in a position to fix the actual cost price of their goods. Reference is made more particularly to raw materials or semi-manufactured goods, such as reclaimed rubber, subject to periodical price changes, and not so much to manufactured goods having price lists exhibiting greater stability.

THE GIANT PNEUMATIC

The outstanding feature of the recent London commercial motor vehicle show was the giant pneumatic tire, seen in sizes ranging up to ten inches diameter. Certainly here and there these tires have been seen on motor coaches and on some of the smaller industrial vehicles, but this is really their first general introduction to the public. Compared with America it may be said that these tires are still an unknown quantity, and it is not surprising that controversy has arisen as to their potentialities. It seems to be established that they give greater tractive power, which is really only to be expected. Further, a better average pace is maintainable over varying conditions of road surfaces. This point is not of such great moment here as in America, owing to the higher average of good roads in Britain. However that may be, there is little doubt that even on good roads there is almost an entire elimination of the road shocks experienced with solid tires and this leads to a reduction in the maintenance costs of the chassis. One expert has expressed the opinion that the saving in this respect is equal to the extra cost of pneumatic over solid tires. Of course, while this may be eminently desirable in the case of the motor coach, it may be plausibly argued that for commercial haulage the extra expense would not be justifiable nor would it be desirable to run the risk of a puncture or a blow-out. It is probable then, that these tires will come into favor more slowly for road haulage than for passenger carrying. As it would not be feasible to inflate these big tires with a hand pump, 120 pounds' pressure being required, a power pump is provided, driven by the engine, with a pressure gage and sufficient flexible tubing to connect with the rear wheels. A year hence it will be possible to talk about the capabilities of giant pneumatics, especially as to whether they will stand up to heavy work under varying loads. In the case of one of our three-ton lorries the total weight when fully laden would be about six tons.

With regard to the makers of these giant tires, the prominent exhibitors were The B. F. Goodrich Co., The Goodyear Tire & Rubber Co., the Bergougnan Tire Co., of Clermont-Ferrand, and the Dunlop Rubber Co., Limited. It must not be imagined that the solid tire was in the background at the show. It was very much to the fore, and in the case of several well-known firms there were developments and improvements.

HARRISONS & CROSFIELD, LIMITED

Charles H. Clark, who presided at the annual meeting of this company, referred, as is customary with chairmen of important concerns, to the many difficulties with which they had been beset, arising out of the disturbed conditions prevailing, and then proceeded to announce increased profits of £249,000 against £200,000 for the preceding year. He emphasized the generally accepted fact that the fall in the price of rubber is not due to any lessened demand for rubber goods, but that large prospective buyers are at the moment out of the market, owing to financial conditions, and this has caused supply to overtake demand. With regard to the restriction of output of rubber, he wished it to be clearly understood that this was only a temporary measure and one not taken with a view of increasing profits, but in order to save the industry from the continuance of losses which threatened to cripple it permanently, many estates already producing at a loss at the price to which rubber has fallen. This restriction of output is really intended to safeguard the increased output of the future, Mr. Clark contended. It follows, therefore, that instead of merely looking after their own interests as traders in general are said to do, the restriction in the output of rubber is really a philanthropic act conceived in the best interests of others. With regard to this point some evident misapprehension exists and it will be recognized as debatable. With regard to rubber manufactures, the fly in the ointment of cheap rubber is the popular outcry for cheaper rubber goods, whether or not the rubber content amounts to 5 per cent or not. The fact that everything else, except the rubber in the goods, may be "up" is entirely ignored.

THE FIFTH INTERNATIONAL RUBBER EXHIBITION

The Fifth International Exhibition of Rubber, other Tropical Products and Allied Industries, to be held in Royal Agricultural Hall, London, England, in June, 1921, will certainly be an event of outstanding importance. Already upwards of thirty British, French and other governments have definitely signified their intention of participating, while several others have provisionally reserved space. Scientific bodies and commercial associations will be well represented and large spaces have been secured by leading producers, manufacturers, makers of machinery, merchants, etc. The demand for space is unprecedented.

The following governments have taken space and are well ahead with their organization for effective propaganda:

Belgium and Colonies	Gold Coast
Brazil	Haut-Senegal Niger
British North Borneo	Haute Volta
Dominica	Ivory Coast
Egypt	Madagascar
Fiji	Mauritania
France	Niger (Military Territory)
French Congo	Portugal and Colonies
French Equatorial Africa	São Paulo
French Guinea	Senegal
French Occidental Africa	Trinidad
Gaboon	Virgin Islands

Colonel Léon Osterrieth has been appointed general commissioner for the Belgian Government, and in the arrangement of the Belgian section he will be assisted by the well-known Congo explorer, Commandant Cayen.

A special committee, working under the enterprising direction of W. S. D. Tudhope, Director of Agriculture, is collecting

exhibits representative of the achievements and possibilities of the Gold Coast and its dependencies.

Arrangements for the participation of the British West Indies are under the supervision of Algernon E. Aspinall, C.M.G., O.B.E., secretary of the West Indies Committee. Trinidad was among the first of the islands to apply for space.

Brazil will occupy the same large space as on previous occasions and the São Paulo Government has, as usual, taken a separate space for a special display.

The exhibits shown by the various governments will embrace the interests not only of the rubber industry but of many other tropical products, such as oils and cotton, which are directly essential to the welfare of that industry, and of timbers, paper-making materials, foodstuffs, etc., which play a vital part in rubber developments.

The exhibition has the cordial support of the Rubber Growers' Association, the Rubber Manufacturers' Association of France, the West African sections of the Liverpool Chamber of Commerce, the Federation of British Industries, the Geographical Society of Lisbon and numerous other commercial associations and scientific bodies. Among the firms which have secured space for exhibits are many prominent producers of raw materials, manufacturers of machinery, tools, compounding ingredients, etc., and leading merchants in tropical products and allied industries.

Full particulars may be obtained from the overseas delegate, Miss Edith A. Browne, F.R.G.S., Exhibition Offices, 43 Essex street, Strand, London, W. C. 2, England.

POST-WAR DEVELOPMENTS IN BRITISH MOTOR TIRES

By Mark Meredith

DESPITE the fact that the price of raw rubber has shown heavy declines, there has been no reduction in the price of motor tires. On the contrary, apparently they are mounting. This is due in part to the high cost of cotton, and partly to the high cost of labor, as well as shipping and so forth. As to rubber and cotton, some of the great tire producers grow their own.

But the greatest post-war development touches rim design. It is plain that at no distant date the straight-side American tire will become universal. As far as existing motor vehicles are concerned, the older types will continue to use clincher tires, because the straight-side tire needs a different sort of rim.

The Society of Motor Manufacturers and Traders' sub-committee concerned with tires, as well as the tire trade's own organization, has for a long time been dealing with the question of reducing the number of sizes of tires on the market. Some practical progress was made in this direction before the war. Much remains to be done, however, towards economizing cost and reducing the necessity for local agents carrying very large stocks of perishable goods.. The solution is to reduce the total number of tire sizes, and that rests largely with car designers.

Perhaps the most significant development is the application of the pneumatic tire to utility vehicles, even of the 3½-ton to 5-ton varieties. Before the war it would have been practically impossible for pneumatic tires to be employed for this class of work. During the campaign, however, such tremendous strides were made in the evolution of exceedingly strong pneumatic tires, as notably those corded types produced by Palmer for aircraft, that there is now no difficulty in providing the strength necessary for carrying heavy vehicles and their loads and for transmitting the power necessary to propel them. As to cost, we are not in the experimental stage. There has been for a long time in progress in America a big development in this direction, and the results are being followed with the closest attention by the trans-Atlantic industry. Under the heading of economy, the pneumatic tire applied to the heavy utility motor vehicle comes out well on top. It enormously reduces shock, economizes road wear and tear to a remarkable extent. It goes a long way towards solving the problem of vibration occasioned by the continuous passage of such vehicles up and down thoroughfares flanked by houses.

Manufacturers are, therefore, making every preparation for building utility motor vehicles of the heaviest sizes to be equipped with pneumatic tires. Moreover, British tire manufacturers have now devoted more than a year to experiments in this connection, with the result that they feel confident that the time has arrived at which they can also standardize such tires and guarantee the results.

Thus, at the time that the roads of Great Britain are being taken in hand by the government at the motorists' expense, we have the welcome prospect that in future a large proportion of utility motor vehicles will not destroy them at the rate they have done in the past.

THE RUBBER TRADE IN EUROPE

By a Special Correspondent

GREAT BRITAIN

DECLARED EXPORTS of rubber from London to the United States during the nine months ended September 30, 1920, totaled $30,259,702, as against $13,863,539 in the corresponding period in 1919. Attention may be drawn to the striking fall in the value of raw rubber exported from London in September, 1920, which was only $17,666 as against $590,005 in September of the preceding year.

Among the articles imported from the United States into Liverpool during the years 1918 and 1919, the following were listed under nondutiable goods:

	1918		1919	
NON-DUTIABLE GOODS	Quantity	Value	Quantity	Value
Airplanes, airships, balloons, and parts of	....	$5,933,109	.....	$8,885,265
Rubber:				
Boots and shoes.....*dozen pairs*	6,372	254,774	32,502	271,512
Tires and tubes and accessories.....	....	.....	.....	219,893
Manufactures, n. e. s.....	....	910,399	.....	957,046
Waste and reclaimed.....*centals*	....	.....	6,330	98,678
Gutta-percha, crude....*hundredweight*	9,498	703,676	752	62,159

Exports of crude rubber from Liverpool to the United States in 1919 were 7,247,838 pounds, valued at $2,985,350, as against 191,186 pounds, valued at $49,230 in 1918.

Recent reports from Great Britain contain an account of an extraordinary general meeting of the The Dunlop Rubber Company, Limited, held in London, September 11, 1920, for the purpose of considering a resolution to increase the capital to £20,000,000 by the creation of 2,500,000 one-pound shares, and a further resolution to capitalize £7,500,000 and pay a bonus of three pounds free of income tax to the ordinary shareholders by the allotment of one-pound shares to that amount.

A. L. Ormrod, who presided, announced that the increase in capital stock would provide the company with authorized capital more than sufficient for the capitalizing of £7,500,000 and the payment of the proposed bonus. Sir Henry Dalziel seconded the resolutions, which were carried unanimously, thereby nearly trebling the company's capitalization, which is now approximately $100,000,000.

The Waste Trade Journal, 150 Lafayette street, New York City, has opened offices at 32 Great Tower street, London, E. C. 3, England, in order to give its readers more efficient service. A competent reportorial staff has been engaged to gather news concerning the cotton, rubber and other industries of interest to its readers, and special facilities for advising and assisting the trade with regard to foreign business have been made available.

A. G. Spalding & Bros., sporting goods dealers, have removed from Buchanan street to their new quarters at 335 Sauchiehall street, Glasgow, Scotland.

FRANCE

Our French contemporary, *Le Caoutchouc et la Gutta-Percha*, announces that Dr. David Spence, the well-known rubber chemist and authority on accelerators, will be a regular collaborator. Dr. Spence is vice-president and general superintendent of the Norwalk Tire & Rubber Co., Norwalk, Connecticut.

Société Méridionale de Caoutchouc, at Arudy (Basses-Pyrénées), with a capital of 3,000,000 francs, has been formed to manufacture rubber goods. The directors are Messieurs Filleul and Disson.

Société Le Caoutchouc Industriel du Sud, at 2 bis, rue de la Riboti, Nice (Alpes-Maritimes), is capitalized at 350,000 francs. The director is M. Letainturier.

Willig et Ottoz, at Aubervilliers (Seine), will manufacture soles, heels and various other rubber articles.

FRENCH RUBBER IMPORTS

According to an official publication, France imported during 1919, 32,453 tons of crude rubber compared with 19,927 tons in 1918. The amounts for the past year were derived as follows: 3,235 tons from Brazil; 12,638 tons from England; 517 tons from French Congo; 321 tons from Senegal; 1,006 tons from West Africa; 8,294 tons from the East Indies; 6,442 tons from other countries. The total value was 216,130,000 francs.

During 1919 the imports of manufactured rubber goods totaled and Industrial Commission granted licenses to the value of 40,200,000 Finnish marks.

NORWAY

The statistics of Norway's imports of rubber manufactures for the January-June period of 1920 are herewith given, together with those of 1914. The official figures are quoted in weight:

		January-June, 1914	January-June, 1920
Soles, rings, and matting, etc.	*kilos*	438,095	103,248
Galoshes	*kilos*	285,718	57,554

RUBBER IMPORTS AND EXPORTS OF FRANCE

STATISTICS of rubber imports and exports of France during 1913, 1918 and 1919 are given in Table I, the weights in metric tons of 2,204.6 pounds, and the values in francs and dollars. Table II shows the values, in francs and dollars, of rubber exports to and imports from the United States, Great Britain, Italy, Spain, and Argentina in 1919.

Out of a total of 17,441 tons of crude rubber, 11,286 tons, valued 79,457,000 francs ($10,884,522), came from Great Britain, no imports from the United States being given in the French

TABLE I

	1913			1918			1919		
	Metric Tons	Francs	Dollars	Metric Tons	Francs	Dollars	Metric Tons	Francs	Dollars
IMPORTS—									
Rubber:									
Crude	17,441	122,783,000	$23,697,119	18,974	133,578,000	$23,853,214	30,698	216,113,000	$29,604,522
Manufactured	3,326	44,386,000	8,566,498	6,438	112,851,000	20,151,964	13,022	270,227,000	37,017,397
EXPORTS—									
Rubber:									
Crude	16,687	75,537,000	14,578,641	2,564	18,050,000	3,223,214	9,910	69,770,000	9,557,534
Manufactured	6,930	100,288,000	19,355,584	4,177	95,888,000	17,122,857	11,163	225,851,000	30,938,493

TABLE II

	United States		Great Britain		Italy		Spain		Argentina	
	Francs	Dollars	Francs	Dollars	Francs	Dollars	Francs	Dollars	Francs	Dollars
IMPORTS										
Rubber, and manufactures of:										
Crude	.....	.....	79,457,000	$10,884,522	.....	.....	.....	.....	.....	.....
Manufactured	76,977,000	$10,544,795	186,581,000	25,559,042	2,434,000	$333,425	.....	.....	.....	.....
EXPORTS										
Rubber goods	.....	.....	42,003,000	5,753,836	11,332,000	1,552,329	12,080,000	$1,654,795	3,822,000	$523,563

TABLE III

	Rhenish Provinces, Occupied Territory			Other Germany			Totals		
	Metric Tons	Francs	Dollars	Metric Tons	Francs	Dollars	Metric Tons	Francs	Dollars
EXPORTS									
Rubber goods	1,407	25,224,000	3,455,342	150	3,098,000	424,384	1,557	28,322,000	3,879,726

11,772 tons, valued 221,134,000 francs. These goods were chiefly of American origin.

BULGARIA

In the list of goods which may be imported into Bulgaria without previous authorization are: Erasers for school use, rubber tubing, belting and articles of rubber or gutta percha, excepting motor tires other than for motor lorries and omnibuses.

DENMARK

The volume of imports and exports of rubber from Denmark for 1918, 1919, compared with 1913, is as follows:

	Imports			Exports		
	1913	1918	1919	1913	1918	1919
Rubber:						
Raw *tons*	1,153	59	7,097	.....	.....	.....
Manufactures	10,126	614	20,681	768	.....	.....

FINLAND

During the period from January 1 to July 31, 1920, out of applications for licenses to import into Finland rubber and rubber products to the value of 63,100,000 Finnish marks (Finnish mark equals $0.193 at normal exchange) the Finnish Trade statistics. Of the imports of manufactured rubber Great Britain supplied 9,214 tons, valued 186,581,000 francs ($25,559,042), while the United States sent 3,469 tons, worth 76,977,000 francs ($10,544,795).

Great Britain was France's best customer for rubber goods as well as her chief source of supplies of crude rubber. French exports to Germany during 1919 are given in Table III, the trade with the Rhenish Provinces, occupied by the Allied Armies, and that with other Germany being shown separately.

The condition of trade in rubber goods between France and the United States during and after the war is shown by the following statistics of the invoiced value of rubber exports declared at the Paris consulate general for shipment to the United States during 1918 and 1919:

	1918	1919
India rubber scrap	$34,413	$280,448
Rubber goods	52,575	.....

Factories handling rubber goods are among those which have taken the longest to recover their former activity.

THE RUBBER TRADE IN AUSTRIA AND GERMANY

By a Special Correspondent

THE Austrian rubber industry faces a crisis with the coming of the winter. Austrian rubber manufacturers complain that they have not received the foreign support promised to them by the reparation commission and that production becomes increasingly difficult. The exchange rate of the Austrian crown is still declining and makes it impossible to buy raw materials, without which no manufacturing for export can be attempted. Coal also is very scarce and it is quite well known that some manufacturers have taken to smuggling coal in wagon lots to keep their factories going. Every decline in the price of the crown of course brings about a further increase in the cost of all articles. The number of unemployed is increasing because factories have to close down. Experts who have studied the situation are of the opinion that the Austrians are somewhat to blame for their present situation. The nation is slow in getting under way again and being deprived of many of its natural markets by the peace treaty, recuperates only slowly.

GERMAN MANUFACTURING CONDITIONS UNSATISFACTORY

The automobile industry, which is promising well at the moment, is still hampered much by the governmental attempt to control luxuries. During the height of the summer when the automobile industry should be most busy the factories were working with a reduction of 30 and more per cent of their capacity, which naturally has a very depressing effect upon the demand for tires and other rubber accessories. Also the bicycle industry has been quieter than usual.

The rubber industry reports a further increase in the cost of production, caused principally by increases in wages which, however, seems to have been counterbalanced by an improvement in the working methods. The working hours are set at 48 hours per week during the height of the summer. Reductions, however, have taken place to 40 hours in some instances.

The general public is still determined not to buy at the present high prices and a real recovery can only be expected after the prices have come down to a more favorable level, an event which may not be deferred much longer.

Another contributory cause to the present economic depression is the uncertainty about the final outcome of the taxation measures which are now under consideration. With large confiscations of personal property ahead of the taxpayer, manufacturers and consumers alike are inclined to go rather slow and there is a visible tendency to keep transactions to as low a level as possible.

CRUDE RUBBER

While Germany only a few months ago had difficulty to secure all the rubber required for its rubber industry, there has been noticeable during the last weeks a steady decline in the demand, with the result that prices have slumped in Hamburg. This is the more surprising as during the same time the exchange rate of the mark has declined again, which as a rule has led to an increase in the price of all imported materials. Lack of occupation in the rubber factories no doubt is the principal cause of the present depression in the German raw rubber market, but it seems that the comparatively heavy purchases of rubber importers during the beginning of the year is a contributory cause. Most rubber is sold at present f. o. b. store in Hamburg. Reclaimed rubber of American origin is offered for delivery four to six weeks from date of order. Very little American reclaimed rubber is at present in stock in Hamburg, but the demand is not very large.

TRADE NOTES

The German industry is apparently tired of being made the scapegoat for everything that goes wrong in modern Germany. Socialistic government in Germany does not seem to be successful and judging from the temper of a meeting of participants in the last Leipsic Fair the patience of the industry seems to have been severely tried. A resolution was passed during this meeting calling upon the Government to discontinue the system of crippling industrial enterprise in Germany by doing away with the export restrictions and the various other institutions destined to regulate trade and industry. If the Government is not prompt in taking the hint, action on the part of the industry was promised at the meeting and something like an employers' strike has been proposed as a remedy.

The recent extraordinary meeting of the Hannoversche Gummiwerke Excelsior A. G., in Hannover-Limmer, was interesting for the information given to the shareholders about the operation of the large works of that firm and the development of the rubber industry in Germany generally. The company has been compelled to buy coal from America to keep going and the director pointed out that consequently no difficulties were expected from the fuel shortage in the future. The capacity of the establishment was considerably extended during the last year and the total turnover of the firm has been increased. This is due partly to a larger production but also to the higher prices that were obtained. The management expects that the depression which has been noticed during the second half of this year will now pass off. While it lasted it found expression in the beginning in cancellation of orders and later on in a practical cessation of new business. The company has been compelled to make reductions in the price of many of its principal lines, to bring these in conformity with the existing prices on the international markets. The supply of German coal is expected to continue small.

The Ostdeutsche Gummi Industrie Hermann Mattern, Koenigsberg in Prussia, has changed its name to Ostdeutsche Gummi Industrie Heinrich und Paul Winterberg.

The Hannoversche Gummiwerke Excelsior Akt. Ges. Hannover has increased its capital from 6,000,000 to 10,000,000 marks.

SOME EUROPEAN RUBBER MARKETS[1]

DENMARK

ONLY three plants in Denmark are engaged in the manufacture of rubber goods, and these concerns, according to 1914 statistics, employed 114 men and 115 women, and produced goods valued at 1,800,000 crowns (1 crown = $0.268), specified as follows: Bicycle tires, 810,000 crowns; tires for automobiles and motorcycles, 85,700; inner tubes, 38,000; general rubber goods, 567,600; finer grades of rubber manufactures, 110,000; rubber linen, 30,000; and rubber clothing, 113,000 crowns. As will be seen from the above, the main production is that of bicycle tires, as a large percentage of the population in Denmark uses the bicycle. Included under "general rubber goods" are elastic ribbon, rubber matting, rubber soles, etc., and by "finer manufactures" is meant special technical and hygienic articles. Rubber clothing includes principally caps and coats. Imports for domestic consumption in 1913 amounted to 6,289,000 crowns.

There is a good market for rubber goods in Denmark, and during the last two years the importation of tires has steadily increased, with American tires very much in demand. The reason is given that American are superior to English, French, or Italian makes. The general terms of payment are 3 months' credit or 2 per cent discount within 30 days. If an extensive trade is to be built up, credit terms should be granted or payment not made obligatory until delivery of goods in the Copenhagen free port.

SWITZERLAND

During 1919 the Swiss imports of raw and scrap rubber reached 4,477 quintals (984,940 pounds), valued 3,204,133 francs ($608,397), as compared with 1,362 quintals (299,640 pounds), valued 1,178,651 francs ($208,179), for the previous year.

According to the last military census, there are 15,000 automobiles and 2,000 motor trucks in Switzerland. Clincher tires are generally used, but owing to the importation of hundreds of

[1] From Commerce Reports No. 224, September 23, 1920.

American motor cars the demand for straight-side tires is constantly increasing. The sources of supply for rubber tires are France, Italy, England and the United States, in their relative order. Solid tires are manufactured in Switzerland and imported principally from France and Italy.

Swiss imports of rubber and rubber goods during 1919 as compared with 1913 and 1918, follow:

Classification	1913	1918	1919
Tubes, hose, pipes without internal layers of other materials	$30,967	$43,584	$147,793
Tubes, hose, pipes with internal layers of other materials	1,007,358	358,956	1,986,313
Strips, sheets, plates, plugs, etc., without layers of other materials	287,578	81,890	1,305,967
Plates, rings, strips, etc., with internal layers of metal or textile materials	203,657	119,086	716,280
Footwear	80,674	19,741	248,693
Fabrics combined with india rubber for industrial use	49,553	70,689	87,165
India rubber or gutta percha applied to fabrics or other materials; waterproof sheeting	60,795	12,146	60,092
Articles for india rubber or gutta percha n. e. s.	290,716	121,637	231,547

In the first four classes in the foregoing table France supplied the greater per cent of the shipments. Great Britain and Italy also figured in this trade, but the part played by the United States was small. However, in the rubber footwear trade the United States led, followed by Austria. The value of shipments from the United States amounted to $177,691.

Market for rubber boots is not favorable, but rubber shoes find a ready sale. These goods are imported from America, France, England, and Italy. This year a great many rubber shoes were supplied by Austria. These, although very cheap, are of excellent quality and of a style well liked by the people here. In pre-war days Russia and Germany were the principal sources of supply.

Electricity and motors have diminished the use of many mechanical goods; leather is easily obtainable here, and rubber belting is, therefore, little if ever used. There were no imports of rubber belting in 1918 and 1919. In 1913 the total value of imports reached $3,570. Metal is generally used here for packing purposes in preference to rubber.

Goods classed as "other rubber goods" are supplied by France, Italy, England, United States, Germany, and Austria, and the market conditions are good for most of them. These articles are distributed by jobbers, retailers, and commission agents. Payments are generally effected by consignment, f. o. b., or cash with order.

Gabardines and rainproof cloth, such as oilskins, etc., of special styles, are worn here; but as a rule rubber clothing is little used in Switzerland.

There are five factories in Switzerland manufacturing cables and rubber-insulated wire. Wire is greatly used, but this article has to be of a special construction, with insulation consisting chiefly of paper. The Italian firm of Pirelli makes the Swiss specification, and most of the wire sold here is obtained from this concern. The Swiss Government is the principal buyer of wire and cables, and bids must be submitted for contracts.

Regarding rubber soles and heels, as leather is cheap in Switzerland substitutes are in little demand, but soles to be nailed on are salable if cheap enough. As concerns round heels and leather center heels, very cheap qualities are mostly in use.

Cheap rubber toys are imported from England, France, and chiefly from Germany. During 1920 a great many toys have been imported from the latter country at very low prices. Toys imported from these countries appeal to the people because of their design. Imports from the United States are small.

Friction tape manufactured in Switzerland is of a poor quality. American tape is preferred, and would find a ready sale if deliveries could be made within a reasonable time.

As concerns druggists' sundries, market conditions are very favorable. Sponges, syringes, hot-water bottles, tubing, etc., are in good demand. These articles are imported mostly from England, America, France, Italy and Germany.

UNITED KINGDOM

The total number of rubber workers in the United Kingdom in January, 1920, was estimated at 71,000 (37,000 males and 34,000 females). In these figures are included a small proportion of rubber workers employed at establishments other than india rubber manufacturing plants.

In April, 1919, the number of firms engaged in all branches of the india rubber manufacturing industry, including the manufacture of rubber goods, was 464, according to the Ministry of Labor.

With reference to the marketing of belting, hose, packings and similar goods, the usual method of supplying is through the medium of rubber factors, or companies, selling engineering supplies. There is a substantial amount of business, especially rubber belting, which is done direct with the larger plants, and there is also a market for rubber goods with manufacturers of articles who use a certain amount of manufactured rubber goods as a component part of their production.

The total imports of rubber boots and shoes reach a large figure, but an increasing production in British plants is expected. British firms usually sell such goods, including canvas shoes with rubber soles, and plimsolls, on open account, and as a rule to the wholesalers, who in turn sell them at an agreed selling price to the retailer.

There is not a heavy demand for druggists' sundries in this market, but there is said to be a chance for the sale of American bathing caps. American rubber soles and heels are too expensive, and due to the difference in styles, rubber clothing is practically all of domestic make. However, there is a market for hard-rubber goods, since the bulk of the trade was formerly in German hands.

The imports of raw and manufactured rubber for the seven months ended July 31, 1920, as compared with like periods of 1919 and 1913, were as follows:

Kind of rubber	January-July 1913	1919[a]	1920
Crude	$66,627,392	$73,443,905	$76,934,241
Boots and shoes	323,889	400,673	2,494,144
Tires and tubes	8,444,837	4,109,905	15,061,257
Other manufactures of rubber	2,121,496	1,457,263	2,164,118

[a] Full statistics for 1919 have as yet not been published.

Of the imports of rubber manufactures, excluding tires, tubes, waterproofed apparel, and boots and shoes, the 1916 imports amounted to $4,714,137, of which total the United States supplied $4,334,382; the 1917 imports reached $2,299,445, with the share of the United States amounting to $2,048,810; and in 1918 the United States furnished this class of goods to the value of $1,126,910 out of a total import valued at $1,297,796.

CONDITIONS IN THE SCOTTISH RUBBER TRADE

The rubber manufacturing industry of the Glasgow consular district is of considerable importance, there being five concerns thus engaged, employing approximately 2,200 people. Their products are chiefly mechanical goods, such as packings, hose, belting, etc., although one concern produces tires and a second waterproof clothing.

With the exception of bicycle and motorcycle tires, all rubber tires used in the district are received from other districts in the United Kingdom or are imported from other countries. The imported tires are chiefly of American origin and are estimated to comprise about one-third of the total in use at the present time. Tires are distributed through agents of the manufacturers, jobbers in accessories, garages, etc., and the usual terms of payment are five per cent discount for payment in seven days, two and one-half per cent for monthly settlement or 30 days net.

There is not a large demand for rubber boots and shoes here, due to the fact that they are not as commonly worn as in the United States. Dealers as a rule carry only small stocks; in fact, some retail shoe dealers do not handle them at all. The majority of these goods are imported chiefly from the United States and are handled by agents in much the same manner as are tires.

Industrial rubber goods are produced in the district, much of the local consumption being of domestic origin. A considerable quantity of this class of manufactures is exported.

American rubber goods have a very satisfactory standing in the Glasgow market, but there is a tendency on the part of the consumer to buy domestic goods when they are obtainable, and at an equal price. American tires, rubber boots and shoes, and druggists' sundries are all well known and meet with a good demand. In other lines local competition is stronger, and foreign products meet with less success.

FOREIGN TARIFFS

COSTA RICA

La Gaceta, of Costa Rica, for July 8 contains a copy of a law dated July 6, 1920, whereby the Government is authorized to double the import duties on certain goods. Among these are listed rubber-bulbed scent sprayers, which formerly were taxed at 2 colones per kilogram, and elastics and garters, formerly taxed at 2 colones, 50 cents per kilogram.

AUSTRALIA

The Department of Trade and Customs, Australia, impose a general tariff of 15 per cent ad valorem on imports of flexible cotton-braided cable, containing rubber, or covered with rubber and cotton tape. British preferential tariff on this item admits these goods free.

BRAZIL

The Belgian Government will henceforth be granted a rebate of 20 per cent by Brazil on customs duties of seven Belgian staples including certain rubber manufactures noted in Article 1033 of customs tariff. On all these articles, including several others, the United States enjoys a similar rebate.

LATVIA

Recent additions to the Latvian import tariff (as cited by the British consul at Riga) include waterproof overcoats, taxable at 5 per cent ad valorem, and rubber footwear, on which a duty of 10 per cent ad valorem is levied.

SWITZERLAND

Further relaxations of the Swiss export restrictions authorize, by a decision of the Swiss Federal Department of Public Economy issued September 14, 1920, the exportation of certain articles under a General Export license. Item No. 529 on the list includes articles of rubber and gutta percha, not previously mentioned in the Swiss Customs Tariff.

IMPORTS OF RUBBER TIRES INTO SOUTH AFRICA

The value of all rubber tires, including inner tubes, imported into the Union of South Africa during the years 1918 and 1919, was as follows:

From—	1918	1919	From—	1918	1919
United Kingdom	$1,090,066	$963,903	Japan	$10,873	$3,319
Canada	44,875	242,288	United States	548,562	714,719
France	76,983	400,703			
Italy	50,822	78,313	Total	$1,822,181	$2,403,245

The customs duty on rubber tires imported into South Africa is 20 per cent ad valorem. A rebate of 3 per cent is granted on the products or manufactures of the United Kingdom and reciprocating British colonies. In 1919 there were 9,000 motor cars of all descriptions registered in the Cape Province, most of which were of American make, consisting of the lighter and medium-priced cars. There were also registered at that time 4,117 motor cycles.

A list of importers of automobiles and accessories in Cape Town can be obtained from the Bureau of Foreign and Domestic Commerce or its district or cooperative offices by referring to file No. BE-6004.—*Commerce Reports*, October 11, 1920.

JAPANESE RUBBER STATISTICS

Rubber and rubber goods appear for the first time among the list of principal exports from Japan to the United States in 1919; shipments were valued at $1,598,469, as against $14,569 in 1918. The following figures give the value of imports of crude rubber and gutta percha into Japan during 1919, and the leading countries of origin:

Articles and countries of origin.	Value.
India rubber and gutta-percha, crude	$8,656,050
British India	205,687
Straits Settlements	7,912,647
Dutch India	21,775
United Kingdom	356,729
United States	151,174
Other countries	8,038

RUBBER TRADE OF THE BELGIAN CONGO

Rubber has long been a standard export of the Congo, but the first cultivated plantations in the colony came of age to be profitably worked only in 1914. These new plantations should add greatly to the commercial value of Congo rubber exports, as the rubber trade gives preference to cultivated rubber over the wild products. The withdrawal of Russia from the rubber market and the diversion of native labor from the gathering of rubber to the gathering of oil products have hindered development in the field of rubber exports, as has also the lack of cultivated plantations in the Congo. In spite of these difficulties, the situation has begun to improve, and further increases in exportation can be expected for the future. The following figures show the exports of rubber since 1912:

Year			Value
1912	*long tons*	3,454	$6,712,182
1913		3,567	3,416,693
1914		2,213	2,052,279
1915		2,144	2,144,163
1916		2,969	3,373,090
1917		3,700	3,918,894

THE RUBBER INDUSTRY IN BRAZIL

By a Special Correspondent

It would seem that experience, resulting from previous disastrous attempts at valorization, is of no profit to those anxious for the welfare of rubber in Brazil. The *Revista Commercial, Industrial e Agricola do Pará*, the organ of the Associação Commercial do Pará, publishes a report by Amando Mendes of his trip to Rio de Janeiro, as delegate of the association, to lay before the authorities there a plan of intervention by the Government through the Bank of Brazil, in the aid of the local rubber market. The delegate was well received, but his plan was not thought much of and intervention was flatly refused. In an earlier issue of the *Revista*, R. C. M. da Costa very frankly said that the trouble with the Brazilian rubber industry was the aversion to any methodical undertaking; ignorance, lack of perseverance, unwillingness to get out of the rut; a tendency to take what nature gives without expending creative energy—all of which leads to that frame of mind where the people wish to improve their lot by cursing the scientific plantations in the East. From the same writer comes practically the only sound suggestion—to renew, by planting, the forests which have been exhausted first because of their accessibility.

IMPORTS OF AUTOMOBILE TIRES

During the last seven years pneumatic tires were imported to a value of 20,545 contos (one conto equals $546 United States currency) of reis. The amount for 1913 was 2,306 contos; for 1914, 1,617 contos; for 1915, 2,274 contos; for 1916, 3,164 contos; for 1917, 3,547 contos; for 1918, 2,549 contos; for 1919, 5,088 contos.

Before the war almost all of the tires came from France. In 1913, over 50 per cent came from France; 21 per cent came from Germany; Great Britain and Italy accounted for about 8 per cent each, while the United States sent only 3 per cent of the total value. However, during the war, the proportions under-

went a change and in 1919, the United States shipped 64 per cent of the total value of pneumatic automobile tires to Brazil, the figures for the different countries now being: United States, 3,287 contos; France, 888 contos; Great Britain and Italy, each 482 contos; other countries, 82 contos.

NEW COMPANIES

A company with a capital of 1,000 contos of reis, operating under the name Industria Brasileira de Borracha, "Berrogain Ltd.," has recently been formed at Rio de Janeiro. The Brazilian industrial Paul Berrogain and a group of Brazilian and Portuguese capitalists are at the head of this concern. In 1916 Mr. Berrogain founded the first factory for rubber goods in Brazil, himself doing the technical work in his factory until it became successful.

A new Belgian company has been formed to undertake the exploitation of various forest products in Brazil, the collection of balata, the cultivation of *Hevea*. The new company—the Société Générale de Culture et d'Industries Tropicales—has a capital of 2,000,000 francs and will be managed from Paramaribo, Dutch Guiana.

MASSARANDUBA AND BALATA

The Commercial Museum of Pará calls attention to the distinction which must be made between the different varieties of *Mimusops*. Both the massaranduba and the balata bearing tree (bullet tree) belong to *Mimusops*. However, the true balata tree is known as *Mimusops bidentada A. D. C.—Sapotaceas*, while the various massarandubas abounding in certain parts of Brazil belong to *Mimusops maparajuba Hub., M. paraensis Hub.*, and *M. Amazonica Hub*. These trees, unlike the bullet tree, yield a latex which is resinous and brittle, of little value commercially.

BRAZIL REGULATES FOREIGN EXCHANGE

Because of recent unfavorable conditions of foreign exchange (quotations on September 9 being 5 milreis 720 reis to the United States dollar), the Minister of Finance of the Republic of Brazil has ordered the bank controller to issue the following circular to all banks in Brazil:

> In accordance with decree No. 1811, of July 19, the strict observance of the provisions thereof is advised, no selling or buying operation of exchange to be effected without the previous authorization of this office, by demanding production of the documents considered indispensable for the proof of legitimate business. In case of offense, article 2 of said decree provides as a penalty the seizure of the values in question and a fine of 50 per cent of the sums.
>
> You are requested, when called upon to do so, to supply the inspector with all details connected with money-exchange operations, as well as to produce the books and documents of your office for examination; also to prove that the bank's capital has been paid up according to law and that you are strictly obeying the provisions to operate, in order to facilitate the general supervision of the banks by this office according to the provisions of the Brazilian laws, and especially of the decrees of August 15, 1891, and February 5, 1892, numbered, respectively, 493 and 727.

THE LOCAL MANUFACTURE OF RUBBER IS BEING ENCOURAGED BY the Government of Brazil, which proposes to advance the contractor a loan of 75 per cent of the expense of erecting factories in Fernambuco and Pará for the manufacture of tires and other articles of Brazilian rubber.

VENEZUELAN IMPORTS OF TIRES AND TUBES DURING THE PERIOD January-June, 1919, were 7,592 kilos, valued 116,562 bolivares (one bolivar equals $0.193 United States currency), as against 206 kilos, valued 2,546 bolivares, in the same period of 1918. Imports of other articles of manufactured rubber showed considerable decrease in the same periods, totaling 8,829 kilos, valued 110,654 bolivares, in 1919, as against 14,095 kilos, values 117,989 bolivares, in 1918.

SOME LATIN AMERICAN RUBBER MARKETS[1]

COLOMBIA

IMPORTATION of rubber tires into Colombia has been constantly gaining during the past few years, and due to the increasing arrivals of automobiles the demand for tires should become still greater. Practically all the tires are imported from the United States by hardware importers and automobile dealers. The greater number imported have been small sizes and of the clincher type. Solid rubber tires for coaches are assessed at the rate of $0.02 per kilo (1 kilo = 2.2 pounds) plus surtax of 2 and 5 per cent. Pneumatic tires are assessed at the same rate as solid tires. In 1913 coach tires were imported chiefly from the United States, with the United Kingdom a second source of supply, but in 1919 the United States monopolized this class of imports. In 1919, pneumatic tires were imported to the value of $23,355, the share of the United States being $22,241.

The market here is a small one for rubber boots, but a good one for rubber-soled shoes, especially rubber-soled canvas shoes. The United States furnishes the greater per cent of imports in this class. Import duties on rubbers are $1 per kilo; on leather shoes having rubber soles, $1.70 per kilo; and on canvas shoes with rubber soles, $1.50; all these plus surtaxes of 2 and 5 per cent. Of an import in cotton shoes with rubber soles in 1919 of $8,239, the United States supplied $7,539.

In the importations of rubber goods for industrial purposes there have been marked increases. Small supplies are kept on hand by the leading hardware dealers, and their terms are the usual one, two and three months' time. Rubber belting pays a duty of $0.01 per kilo; rubber hose, $0.01 per kilo; rubber washers, $0.20 per kilo; all of these plus surtaxes of 2 and 5 per cent.

The following table gives the imports of rubber belting, rubber hose, and rubber washers and packing for 1913, 1918 and 1919:

Articles and Sources of Supply	1913	1918	1919
Rubber belting:			
United States	$22	$481	$1,284
United Kingdom	267	...	...
Rubber hose:			
United States	1,408	775	1,678
United Kingdom	132	15	252
Germany	38	...	...
Rubber washers and packing:			
United States	276	2,241	2,025
United Kingdom	...	173	15
Panama	...	...	90

Small quantities of rubber clothing and druggists' sundries are imported. Great Britain supplies the few imports of clothing, and insulated wire and cables come from the United States, imports of the last named being on the increase. Cotton cloth, rubber-coated, pays a duty of $0.90; cotton cloth, rubber-coated, for ponchos, $1.10; woolen cloth, rubber-coated, $1.35; plus the usual 2 and 5 per cent surtaxes. Rubber, in bulk, purified or not, pays a duty of $0.30 per kilo; hard rubber, vulcanized, for dental uses, $1.30, plus the surtaxes; insulating wire and cables, $0.01; rubber soles and heels, $0.35; rubber toys, $0.60; rubber matting, $0.50; rubber friction tape, $0.02; and druggists' sundries pays a duty of $0.25. All plus surtaxes of 2 and 5 per cent.

DOMINICAN REPUBLIC

There are no factories producing rubber in this district, nor are statistics available showing the various classes of rubber goods imported, but the total imports of all manufactures of rubber into the Dominican Republic were valued in 1913 at $31,032; in 1917 at $84,266; and in 1918 at $143,976. It is estimated that this district would use about 30 per cent of the total import.

Imports consist, for the most part, of tires and tubes, a few rubber soles and heels, and a few druggists' sundries, with 95 per cent of these imports coming from the United States. The only import demand is for rubber tires and tubes. All merchants desire long credits, and business usually goes to the house that will grant the longest credits. Motor cars in this district are almost entirely of American make. There are a few motorcycles in use

[1] From Commerce Reports, No. 229, September 29, 1920.

and many bicycles; also carriages in towns usually have rubber tires.

MEXICO

Two small rubber factories are in operation in the City of Mexico, both of which manufacture automobile tires and raincoats. The making of other articles than tires has not been developed beyond an experimental stage. It is estimated that to meet the demand of the entire Republic of Mexico there should be an output of 600 to 1,000 tires per day. Practically the entire consumption of manufactured rubber goods in Mexico is imported from the United States, though previous to the war some sundries were received from Germany and a very few Italian and French automobile tires. Some drug sundries were imported from Japan, but only in small quantities.

Local competition has considerably reduced the importation of tires from the United States, there being an import duty of 1 peso ($0.498 in United States currency) per kilo (2.2 pounds). The Mexican market is overcrowded with American tires, while the outlet is a restricted one. Practically all sizes are in use. Two American concerns maintain offices in Mexico City, and a few manufacturers cover portions of the field with traveling salesmen, while a few others have agencies with local dealers.

There is a strong demand for sport shoes. However, American firms are reluctant about extending terms of draft against delivery. On the other hand, the Mexican importer dislikes to be forced to advance cash with order when long delays under present transportation and manufacturing conditions are considered. The market possibilities will continue so as long as conditions remain unsettled.

The business of the mining and oil fields is almost entirely controlled by a few well-known brands of belting, packing, and hose.

In rubber clothing cheap grades are used in parts of the country where raincoats are needed.

In most cases small dealers lack financial ability to import direct and find it to advantage to purchase from Mexico City stocks. In the sole and heel trade most manufacturers have yearly contracts for direct importation, and it is impossible to ship direct to small dealers. American toys are too expensive for this market, the control being in the hands of the Japanese, who supply a cheap grade. Rubber matting is not in general use.

VENEZUELA

In 1918, the only year for which definite statistics are available, rubber tires were imported to the extent of 1,511 pounds, valued at $2,038. The best gage for the required imports is the fact that there are about 2,000 automobiles in this district, and the number of tires needed can be reckoned accordingly. The cars are practically all standard American makes, and quick detachable tires are preferable. These are imported from dealers in Caracas, the tires imported from countries other than the United States are so few as to be negligible. There are practically no imports of rubber boots and shoes, nor of rubber for industrial purposes. Other imports are confined to goods used by the drug trade, to insulated wire, and rubber heels and soles.

The present demand for tires in the Maracaibo district is small, but with the expected increase in the number of automobiles, the demand for rubber tires will be greater. Sizes generally in use are 30 by 3-inch, 30 by 3½-inch, 32 by 3½-inch, and 33 by 4-inch. The Venezuelan customs duty on tires is at the rate of 0.75 bolivar per kilo of gross weight.

There is very little demand for rubber boots and shoes. The customs duty on this class of goods is 2½ bolivares per kilo of gross weight.

The market for rubber belting is fairly good, particularly in small sizes of 4 or 5 inches. There is also a light demand for larger sizes by petroleum companies for drilling operations. Rubber hose finds its chief demand among concerns requiring steam hose, but this use is quite limited. There is a fair demand for industrial rubber goods, and practically all imports are supplied by the United States.

MEXICAN-MADE TIRES NOT COMPETITIVE

The only competition offered recently to American automobile exports has been through the manufacture of tires by two factories in Mexico City. This local product is placed on the market at prices 25 per cent lower than the prices of the tires imported from the United States. On account of a shortage of raw materials (chiefly of American origin) the output of the Mexican tire factories is small and at times negligible. These plants have been unable as yet to perfect their processes of manufacture, and their product is not so uniform as that of the American standard tire manufacturer. The Mexican-made tire has not, therefore, been a serious factor in competition. Tires for trucks are dutiable at $11.29 per 100 pounds, and tires for passenger cars at $22.59 per 100 pounds.

The Rubber Trade in the Far East

By a Special Correspondent

MALAYA

THE heavy fall in prices of local products, including rubber, is said to be the cause of the present money stringency. Conditions are not so serious in Singapore and old-established British firms seem to have little trouble, although others have had to allow extensions of credit.

With regard to the rumor of serious trouble in Penang, investigation showed that, to the contrary, Penang is quite prosperous.

Recent reports from Kelantan, Kedah and Perlis, also indicate favorable conditions. Within the last ten years these states have developed wonderfully. In Kelantan there are now 152,739 acres under rubber, which in 1919 yielded 2,077 tons, against 1,745 tons in 1918. In the state of Kedah 112,192 acres are under rubber, and the exports amounted to 5,021 tons in 1919.

The Chief Secretary's report on the Federated Malay States shows that during 1919 the market for rubber was much more favorable than in 1918, although the demand at the end of the year had not equalled expectations, and price fluctuations were less noticeable than in previous years. Shortage of staff handicapped research work, but despite this, much information has been collected.

Mouldy rot is regarded as the most serious disease affecting the rubber tree in Malaya. While positive results have not yet been obtained, it has been shown that brown bast can be controlled by a change of the tapping system.

A correspondent of the *Malayan Tin and Rubber Journal* calls attention to a certain rule of the Singapore Chamber of Commerce Rubber Association which is unfair to the buyer of rubber. This rule governs the question of delivery and contains the following:

Any objection as to quality, description or packing, etc., shall be lodged in writing with the sellers on the day following delivery. If any lots are found to be inferior to sample or to quality called for on contract, buyers shall accept this inferior rubber with allowance, to be fixed either mutually or by arbitration. In case the inferiority of a lot calls for an allowance of over three cents per pound, buyers shall have the option of rejecting the inferior rubber and sellers will have to replace within six days from the date of award.

It is contended that an allowance up to three cents a pound is too high and that buyers should have the privilege of refusing rubber even if the inferiority called for an allowance of only one cent per pound. Furthermore it is claimed that the rule encourages careless grading and packing.

On the other hand, the seller argues that he must be protected against trifling claims, which would be especially prevalent when rubber is low and the contract had been entered into when the price was much higher.

The fact of the matter seems to be that both sides are right and wrong and that the only real grievance is against the maximum of three cents, for if rubber is poor enough to warrant an allowance of three cents it can hardly be called a really fair tender.

RUBBER SEED OIL

In his report on the Agricultural Department of the Federated Malay States in 1919, L. Lewton-Brain, Director of Agriculture, states that the experimental hydraulic oil-expression plant of the department has been lent to the Malayan Oil Mills, Limited, a local company formed primarily to manufacture rubber seed oil. It has been ascertained that rubber seed on storage deteriorates and produces an oil containing up to about 25 per cent of free fatty acids, and that such oil is not generally suitable as a substitute for linseed oil. Further, this oil is not suitable for many purposes owing to its slower drying power, compared with linseed oil, and it is necessary to prepare a "boiled" oil for commercial purposes.

Considerable progress has been made in the work of refining the oil, but it is probable that the processes required can be carried out only in a factory under the supervision of a trained chemist. Experiments on the preparation of "boiled" oils have shown that a satisfactory product can be obtained from a raw oil free from fatty acids.

A further problem, namely, the prevention of the deterioration of seed in storage, remains to be solved. Freshly collected seed yields an oil with very low acid content.

CEYLON

According to the report of H. C. Pinching, A. R. C. S., the soil conditions, the growth of the trees, and the output per acre are surprisingly good in Ceylon. A field of trees, averaging 16 years of age, gave 450 pounds per acre on alternate-day tapping of a half spiral cut. The average general increase of yield per acre per year for the first few years is 50 pounds, as follows:

	Pounds Per Acre
6 years	150
8 years	300
10 years	400
12 years	500

From 12 years onward very little increase in yield is noted; growth and crops are practically stationary and the effect of seasonal peculiarities upon the yield appears to be very marked.

A report by Mr. Petch indicates that the number of trees attacked by brown bast is not so great in Ceylon as in some other rubber-producing countries. It is now held that brown bast is a physiological result of tapping, and is more common in daily tapping than in alternate-day tapping.

Experiments at Peradeniya with different manures showed the greatest increase in a tree which in July, 1916, measured 8.30 inches and in January, 1920, measured 23.42 inches. The same mixture was used for this tree and for another, which measuring 7.04, increased to 20.91 inches in the same time. The rates of increase of these two trees represent the highest and the lowest, respectively, of all the trees experimented on.

It is reported that Germany is planning to resume trade with Ceylon in all articles except machinery. German firms are offering samples of various articles, one firm having even sent a big consignment of goods. It further appears that German firms have proposed to local merchants to exchange rubber and other local products for German goods as yellow metal, bronze, etc. The drawback to this seems that some German firms are not prepared to negotiate business by bank credit.

THE NETHERLAND EAST INDIES

The local press is taking note of the fact that America and Japan are striving to increase their interest in the rubber cultivating industry in order to satisfy their home requirements. It is foreseen, however, that production from Java and Sumatra, which is mainly sent to the Netherlands, will eventually go to Germany and Austria.

America's desire to become independent as far as her supply of rubber is concerned, will not be realized owing to the fact that it will never find sufficient land to plant enough rubber for home consumption, they say.

It is further pointed out that at one time the local government refused a petroleum concession to a combination connected with the Standard Oil Company, but adds the belief that as far as rubber is concerned, the Netherland East Indies would stick to its liberal policy and continue to admit foreign capital.

The shareholders of the Indian Rubber Company have accepted an offer from a British concern for the sale of their Sumatra estates.

At a forthcoming meeting the shareholders of the "Ambalatoe" will be asked to consider the sale of 2,000 out of 4,500 bouws (one bouw equals 1.7537 acres) of rubber land to the Sumatra Rubbercultuurmaatschappij "Serbadjadi."

It is rumored that The Goodyear Tire & Rubber Co. is negotiating for the purchase of the estates belonging to the Rotterdam Deli Co., and to the Krapah Tobacco Co. If these negotiations succeed, this concern will control 30 estates, covering 100,000 acres, all in the East Coast of Sumatra.

A report from the division for agricultural economics indicates the various parts of Sumatra said to be suitable for different crops. Thus, Tapanoeli is favorable for rubber. In the newly opened district of Muaru Labuh, along the Liki river and on the northern slope of Mt. Korintji, rubber is being cultivated with success in parts, although on the whole the district is considered to be too wet for rubber.

The Djambi Highlands offer good opportunities for rubber. Vast areas are available for the purpose. The soil is good; the rainfall, though not heavy, is regular; but there is a lack of roads and population. The Muara Bungo district in these parts seems to be capable of development with least expense.

The area under rubber in the East Coast of Sumatra at the end of 1918 amounted to about 320,000 acres. The total cost of bringing to the bearing stage an estate opened up before 1919 is estimated to average 660 gilders per acre. This average is increased to 720 per acre for lands opened up after 1919.

At the end of 1918, 211,200,000 gilders were invested in rubber estates in this part of Sumatra.

SOUTH INDIA

The Secretary of the U. P. A. S. I. (United Planters' Association of South India), has compiled statistics relating to the production of rubber in South India. Figures of about 5,000 acres of rubber not belonging to the U. P. A. S. I. were also obtained.

YEARS OF PLANTING

Year	Planted Acreage	Total at December 31
1904 and previously	912.79	912.79
1905	1,841.54	2,754.33
1906	5,709.39	8,463.72
1907	5,486.90	13,950.62
1908	5,812.25	19,762.87
1909	2,245.15	22,008.02
1910	5,836.68	27,844.70
1911	8,178.24	36,022.94
1912	4,260.57	40,283.51
1913	2,840.51	43,124.02
1914	1,095.26	44,219.28
1915	129.52	44,348.80
1916	114.08	44,462.88
1917	System changed.	44,463.10
1918	1,203.54	45,666.64

GEOGRAPHICAL DISTRIBUTION OF ESTATES

	Acreage Planted	Acreage Tapped	Crops in 1918 Pounds
British India—			
Wynaad	61.47	.....	.....
Nilgiris	134	52	6,615
Malabar	10,967.25	7,744.16	1,192,426
Anamallais	1,071	480	48,628
Totals	12,233.72	8,276.16	1,247,669
Coorg	779	590	21,013
Native States—			
Travancore—			
Mundakayam	12,164.97	10,378.56	2,132,944
Kanan Devans	819	549	73,485
Central Travancore	112	112	10,016
South Travancore	10,081.85	8,114.96	1,883,510
North Travancore	4,268.35	3,725.52	778,763
Totals	27,446.17	22,880.04	4,878,718
Mysore—North Mysore	180	80	8,632
Cochin State	5,027.75	4,245.61	723,251
Grand totals	45,666.64	36,071.81	6,879,283

The total number of laborers employed during 1918 was 27,381.

It is noted that the cultivation of both tea and rubber is being taken up by Indians. There are now about 20 rubber companies with estates aggregating some 14,000 acres under Indian management in Travancore.

At a recent meeting of the United Planters' Association of Southern India it was resolved that the Government be approached as regards its willingness to help to establish a factory in Southern India for the manufacture of rubber goods.

THE RUBBER INDUSTRY IN UGANDA

ACCORDING to a recent Government report, the acreage under Pará rubber on European owned plantations is estimated at 11,255. The tappable area, however, is still small, owing to the great number of trees planted in recent years. For the year 1918-19, the exports of plantation rubber amounted to 253,063 pounds, value £12,893. This shows an increase of 108,336 pounds over the previous year, and an increase in value of £2,928. In certain districts, the natives are taking up rubber-planting with enthusiasm. It appears that a rubber planter with experience in Sumatra and Malaya declared that the prospects for rubber in the Baganda Province are good, provided the industry receives the proper assistance while yet in its infancy. This authority regards the soil as superior to that of the Federated Malay States, the configuration of the land as almost ideal, and the risk from disease small, since the areas under cultivation were originally grass and not forest land. As to rainfall, this is less, but alternate daily tapping will remedy this. He further considers that the growth of trees here will be as rapid as in Sumatra. Altogether this is quite a satisfactory opinion.

On the question of the appointment of an official adviser on rubber, the investigating commissioners are of opinion that this would not be practical, and recommend, instead, that planters join the Rubber Growers' Association, the Government bearing part of the expense of subscription. This association, it is understood, would then arrange for a competent rubber chemist, and, if possible, a mycologist should be sent out, the Government again sharing the expense with the planters. If Uganda is to get any benefit of technical advice, this should be done at once.

The commissioners also recommend the enforcement of the Plant Pests Ordinance, which would greatly benefit the estates.

At present the industry is a good deal hampered by the rates charged on the Uganda Railway; it has, therefore, been suggested to aid planters by reducing the rate, asking the railway to accept tare weight for rubber as is done in the Federated Malay States, and to reduce the very high rate of insurance now imposed.

As regards labor, it has been found that the local native is good at all work on rubber estates except the most important of all—tapping. It is, therefore, advised to subject prospective tappers to a term of apprenticeship, if possible, on expiration of which they should be given certificates by the Agricultural Department, according to their merits, and should then be engaged on contract. To encourage labor, the Sumatra custom of giving native labor a bonus on results is offered for consideration.

CURTAILMENT OF RUBBER PRODUCTION PROGRESSES

THE COMMENDATIONS regarding a 25 per cent curtailment in the production of plantation rubber made by the Rubber Growers Association of London have been accepted by 80 per cent of the producing acreage owned by members domiciled in the United Kingdom.

Seventy-five out of 111 members of the Rubber Producers' Association of Malaya have agreed to restrictions to date, and the Japanese Planters' Association, representing 65,634 planted acres unanimously decided to restrict on similar lines. The local associations are endeavoring to bring the Chinese producers in Malaya into line, and the agents of the principal Shanghai companies are working to that end. It is assured that over 70 per cent of Ceylon local producers are willing to restrict output, and the members of the International Association at the Hague present at a recent general meeting were almost unanimous in favor of the restriction scheme, and their council has sent out a circular recommending a 25 per cent reduction, to which they are asking at least 70 per cent of their members to adhere.

Many companies are already carrying out a policy of restriction and others have cabled instructions to their estates to prepare for restriction becoming effective on November 1, 1920, and continuing until January 1, 1922.

BALATA PRODUCTION IN DUTCH GUIANA DECLINING

EXPORTS of balata from Dutch Guiana in 1919 showed a decrease in value of $147,919 from the figures for 1918, which totaled $900,032. The total amount for 1919 was valued $752,113. Rubber showed a gain, from $2,577 in 1918 to $5,014 in 1919.

Declared exports invoiced at the consular agency at Paramaribo for shipment to the United States during 1918 and 1919 included balata and rubber as follows:

		1918		1919	
		Quantity	Value	Quantity	Value
Balata	*pounds*	118,720	$106,127	338,750	$302,456
Rubber		4,095	2,913	.....	.....

The production of balata shows a steady decline, although the prices received were considered good. The industry is gradually falling into the hands of two or three large corporations, and this year saw the selling out of one of the oldest individual operators to one of the larger interests. This is mainly due to the fact that areas that pay to exploit are getting farther from the coast, and the transportation and cost of labor are therefore steadily increasing, so that only firms with large financial backing and organized forces of labor can continue in this business.

IT IS BELIEVED THAT FROM 75 TO 90 PER CENT OF THE MOTOR CARS imported into China are of American make. Shanghai imports of motor cars have increased from 162 in 1913 to 961 in 1919. Most of these are four or five passenger cars, only 20 or 30 per cent being of the heavier seven-passenger type. The clincher tire is used on many of these cars, and for the trucks, which are of the lighter kinds, both solid rubber and pneumatic tires are used.

Recent Patents Relating to Rubber

THE UNITED STATES

GRANTED SEPTEMBER 21, 1920

NO. 1,353,161 Disk wheel for pneumatic tires. R. C. Hoffmann, Argos, Ind.
1,353,215 Eraser attachment for pencils. W. J. Campbell, Indianapolis, Ind.
1,353,260 Mattress support with inflatable, fluid-containing members. F. I. Monks, Houston, Texas.
1,353,325 Cushion wheel. A. S. Duffies, Markesan, Wis., and F. Mead, Chicago, Ill.
1,353,326 Cushion wheel rim. A. S. Duffies, Markesan, Wis.
1,353,396 Closure with gasket for jars, bottles, etc. A. and H. Ingram, assignors to Ingrams, Inc.—all of Brooklyn, N. Y.
1,353,397 Closure with gasket for jars, bottles, etc. A. and H. Ingram, assignors to Ingrams, Inc.—all of Brooklyn, N. Y.
1,353,398 Closure with gasket for tumblers, jars, bottles, etc. A. and H. Ingram, assignors to Ingrams, Inc.—all of Brooklyn, N. Y.
1,353,399 Closure with gasket for jars, bottles, etc. A. and H. Ingram, assignors to Ingrams, Inc.—all of Brooklyn, N. Y.
1,353,400 Closure with gasket for jars, bottles, etc. A. and H. Ingram, assignors to Ingrams, Inc.—all of Brooklyn, N. Y.
1,353,415 Pneumatic tire valve with rubber gasket. J. N. Newsom, H. E. Harder, and W. F. Leschen, assignors to Newson Valve Co.—all of St. Louis, Mo. (See THE INDIA RUBBER WORLD, April 1, 1920, page 434.)
1,353,573 Demountable rim for pneumatic tires. G. Esmarian and K. Kafafian, Paterson, N. J.
1,353,592 Stocking supporter. F. E. Howard, Lamanda Park, Calif.
1,353,622 Reinforced insulating material. H. S. Ashenhurst, Chicago, Ill.
1,353,625 Pen-brush. A. F. Brudenburg, assignor of one-half to H. E. Palmer—both of Dayton, O.
1,353,627 Collapsible pail for filling automobile water tanks. D. H. Bucher, Louisville, Ky.
1,353,671 Stocking supporter. C. McD. Supple, Boston, Mass.
1,353,679 Fountain mucilage-brush with side lever to compress inner sac. P. I. Venard, Denver, Colo.
1,353,700 Cushion spring tire. W. N. Allen, San Antonio, Tex.
1,353,709 Easel for holding flowers, having collapsible water font. M. V. Bauer, Washington, D. C.
1,353,750 Rubber garment protector with ventilating side-openings. K. Heitler, New York City. (See THE INDIA RUBBER WORLD, November 1, 1920, page 110.)

GRANTED SEPTEMBER 28, 1920

1,353,857 Respirator. D. K. H. Schumann, Hamburg, Germany.
1,353,878 Cap for tire valve. W. H. West, Stockton, Cal.
1,353,896 Combined eraser-holder and pencil point-protector. V. B. Dawson, Bridgeton, N. J.
1,353,921 Solid rubber and spring tire. G. C. Lehr, St. Louis, Mo.
1,353,942 Dental vulcanizer, flask and charger. D. A. Akin, assignor of one-third to J. Meckay and one-third to E. F. Fuller—all of Spokane, Wash.
1,353,943 Demountable rim for tires. A. L. Anderson, assignor of one-fourth to I. F. Mazna and one-fourth to G. B. Shafer—all of Spokane, Wash.
1,353,988 Transversely-split demountable rim for tires. R. S. Bryant, assignor by mesne assignments to The Standard Parts Co.—both of Cleveland, O.
1,354,017 Pressure-gage for tires. J. A. Bowden, Los Angeles, Cal., assignor to A. Schrader's Son, Inc., New York City.
1,354,095 Garter stud attachment. D. C. Evans, Cincinnati, O., assignor to Pioneer Suspender Co., a corporation of Pennsylvania.
1,354,212 Apparatus and method for regulating breathing for singing and wind-instrument practise. J. B. Rigg, Oak Park, Ill.
1,354,221 Demountable rim vehicle wheel. A. H. Shoemaker, Seattle, Wash.
1,354,392 Resilient tire. M. A. Green, Rupert, Idaho.
1,354,411 Reinforced tire. E. Y. Malone, Mobile, Ala.
1,354,433 Lens clarifying device. C. De Felice, New York City.

GRANTED OCTOBER 5, 1920

1,354,468 Demountable rim for tires. W. E. Copithorn, Natick, Mass.
1,354,480 Hose coupling. F. Hachmann, St. Louis, assignor of one-eighth to D. M. Hutchinson, Ferguson—both in Missouri.
1,354,499 Interchangeable cushion heel. C. H. McLean, Boston, Mass.
1,354,504 Hose reel. R. H. Montgomery and J. B. Dingwall, said Dingwall assignor of his one-half to J. E. Dingwall—all of Toronto, Ontario, Canada.
1,354,520 Tire. B. P. Stedman, Peoria, Ill.
1,354,524 Telephone head set. J. S. Timmons, New York City.
1,354,643 Lock for air-hose couplings. R. W. Brower, Proctor, Minn.
1,354,666 Milking machine. F. A. Lane, assignor to D. H. Burrell & Co.—both of Little Falls, N. Y.
1,354,669 Hose clamp. A. Leverdahl, Aurora, assignor to Independent Pneumatic Tool Co., Chicago—both in Illinois.
1,354,680 Cabinet hose-rack. C. and R. Nuhring, Cincinnati, O.
1,354,684 Waterproof breast adjuster with elastic straps, for preparation of dead bodies. J. G. Purcell, New Orleans, La.
1,354,774 Display tire holder. M. Metzger, Chicago, Ill.
1,354,846 Repair patch for rubber footwear. J. Robertson, Jr., Weehawken, N. J.
1,354,905 Insulating splice cover. J. B. Hamilton, assignor of one-half to J. C. Farr—both of Hoboken, N. J. (See THE INDIA RUBBER WORLD, March 1, 1920, page 366.)
1,354,938 Dental plate of hard and soft rubber. A. C. S. Angel, Copenhagen, Denmark.
1,354,984 Inner tire. T. I. McCaffrey, Seattle, Wash.
1,355,011 Resilient tire. J. D. Sullivan and H. L. Fry, New Castle, Pa., said Fry assignor to said Sullivan.
1,355,033 Rack for automobile tires. J. A. Cheape, Charlottesville, Va.
1,355,042 Tire shipping crate. W. F. Harwood, Richmond, Va.

GRANTED OCTOBER 12, 1920

1,355,166 Demountable rim for tires. K. B. Rice and R. E. Muffly, Canton, O., said Muffly assignor of one-third of his right to said Rice.
1,355,271 Inflated article. F. T. Roberts, Cleveland, O., assignor by mesne assignments to Paramount Rubber Consolidated, Inc., Philadelphia, Pa.
1,355,276 Ear drum protector. F. A. Schultz, Hasbrouck Heights, N. J.
1,355,359 Tire valve cap. F. Rasmussen, Blaine, Wash.
1,355,362 Metal and rubber shoe heel. S. G. Shapiro, New York City.
1,355,564 Aerial torpedo, with supporting gas bag. W. T. O'Connor, Jackson, Ky.
1,355,609 Pneumatic tire shoe. O. Larson, Chicago, Ill.
1,355,641 Demountable tire rim. W. G. Adams, East San Diego, Cal.
1,355,748 Resilient tire. D. S. Kennedy, New York City.
1,355,771 Means for fastening cushion tires to rims. F. L. Nienaber, assignor to Lambert Tire & Rubber Co., Inc.—both of Akron, O.
1,355,781 Repair inflating device for game balls. M. Rodgers, assignor of one-half to Alex. Taylor & Co., Inc.—both of New York City. (See description elsewhere in this issue.)
1,355,788 Pneumatic tire. C. W. Strauser, New York City.

GRANTED OCTOBER 19, 1920

1,355,827 Shoe sole of rubber with cleat held to sole by cohesion. P. J. Finneran, Boston, Mass.
1,355,846 Tampon. D. A. Rannells, Logan, O.
1,355,973 Elastic sprinkler cap. T. L. Hollingsworth, assignor by direct and mesne assignments to the Elyria Specialty Co.—both of Elyria, O. (See THE INDIA RUBBER WORLD, October 1, 1920, page 30.)
1,355,986 Semi-solid tire. J. T. Lister, Cleveland, O.
1,356,113 Rubber heel with embedded fabric reinforcement. G. J. Reuter, Atlanta, Ga.
1,356,115 Cushion tire. J. Saul, Jersey City, N. J.
1,356,126 Hose coupling. L. V. Claire, assignor of one-third to M. A. Wohlscheid, both of Grand Rapids, and one-third to N. Wohlscheid, Westphalia—all in Mich.
1,356,132 Method of and apparatus for making tires. H. J. Doughty, Providence, R. I., assignor to Doughty Tire Co., Portland, Me.
1,356,234 Sheet-rubber liner of chemically treated vegetable fiber. A. M. E. Streitjffert, Norristown, assignor to Diamond State Fibre Co., Bridgeport,—both in Pa.
1,356,392 Corset with elastic ventilating strips. S. J. Newman, assignor to I. Newman & Sons—both of New Haven, Conn.
1,356,476 Cap for tire valves. M. C. Schweinert, West Hoboken, N. J.

GRANTED OCTOBER 26, 1920

1,356,519 Surgical appliance. B. Douglas, Baltimore, Md.
1,356,537 Cushion tire. J. N. McFate, Phoenix, Ariz.
1,356,549 Rubber cushioned heel. F. Neubauer, Cleveland, O.
1,356,662 Rubber vulcanizing repair package. L. A. Sherman, assignor by direct and mesne assignments of one-fourth to H. E. Sherman and one-half to O. K. Herndon—all of Kansas City, Mo.
1,356,708 Resilient molded facial pad for supporting field-glasses, etc. E. T. P. Goodyear, Reigate Heath, England.
1,356,717 Waterproof shoe with removable heel and sole. L. Hoffmeister, Milwaukee, Wis.
1,356,783 Rubber fabric. J. McI. Ogilvie, Toronto, Ontario, Can.
1,356,817 Inflatable toy ball with valve closure. T. M. Gregory, Akron, O.
1,356,937 Catamenial belt. A. Miyamoto, San Francisco, Cal.
1,356,955 Invisible suspenders. M. H. Aved, Harvey, N. D.
1,356,961 Footwear and method of manufacture. H. Bullock, Andover, assignor to Converse Rubber Shoe Co., Malden—both in Mass.
1,357,006 Bath rubber or mitten. M. W. Schloss, assignor to Treo Co.—both of New York City.
1,357,009 Tire inflation signal. W. H. Thorpe, Mt. Vernon, N. Y.
1,357,068 Self-filling fountain pen. G. H. Macdonough, Boston, Mass.
1,357,074 Artificial foot with elastic cushion. H. J. Morris, Kansas City, Mo.
1,357,098 Cord tire. F. I. Kryder, Akron, O.
1,357,116 Tire boot fastener. W. M. Rapp, Marion, Ind.
1,357,144 Demountable rim for tires. J. R. Brown, Halls, Tenn.

THE DOMINION OF CANADA

GRANTED SEPTEMBER 21, 1920

204,037 Tire inflator. W. A. and G. W. Delahey, coinventors, Ottawa, Ontario.
204,045 Pneumatic tire. E. P. Altenberg, Columbiana, Ohio, U. S. A.
204,052 Exercising device with elastic cords. F. H. Blake, Toronto, Ont.
204,059 Resilient core for tires. J. H. Dalbey, Elgin, Ill., U. S. A.
204,093 Garden hose spray nozzle support. S. Joliff, Vancouver, B. C.
204,095 Tire having inner ribs formed integrally with the casing, the middle one being longer and having grooves to accommodate the others. G. I. Kavanagh, Montreal, Que.
204,101 Rubber tire reinforced with wire gauze plates embedded therein. I. Leo, Toronto, Ont.
204,105 Pneumatic tire reinforced with rawhide between layers of fabric. L. Loeb, New York City.
204,133 Pneumatic tire composed of casing containing separate inflatable cells with valves to prevent escape of air after inflation, etc. H. H. Richards, Knoxville, Tenn., U. S. A.
204,148 Armored inner tube. H. H. Schuster, Chicago, Ill., U. S. A.
204,157 Non-skid resilient tire slotted to engage separate tread blocks. H. H. Taylor, San Francisco, Calif., U. S. A.

Chemical Patents will be found on pages 172, 173. Machinery Patents on pages 180 and 181.

GRANTED SEPTEMBER 28, 1920

204,289 Demountable rims for tires. E. G. Gehrlich, Fountain City, Wis., U. S. A.
204,295 Anesthetizing machine. J. A. Heidbrink, Minneapolis, Minn., U. S. A.
204,366 Hose coupling. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of H. R. Gilson, New Rochelle, New York, U. S. A.
204,422 Adjustable closure for bottles. F. Cieszkowski and F. Janiszewski, assignee of a half-interest—both of Robyville, Ohio, U. S. A.

GRANTED OCTOBER 5, 1920

204,436 Aeronautic garment for personal wear, with inflatable pockets. J. Kropacz and J. Jakubiez, coinventors, both of Calgary, Alta.
204,440 Demountable split rim for tires. C. C. Hanch, Detroit, Mich., and R. A. Brannigan, New York City, coinventors—both in U. S. A.
204,443 Demountable rim for tires. L. U. Stenger, Detroit, Mich., and R. P. Summerfield, Alameda, Calif., coinventors—both in U. S. A.
204,485 Fountain pen cleaner with flexible tube for water faucet connection. C. W. Garver, Ashland, Ohio, U. S. A.
204,504 Demountable rim for tires. W. S. Krause, Childress, Tex. U. S. A.
204,549 Rubber overshoe with felt insole having fabric facing. J. R. C. Struthers, Winnipeg, Manitoba.
204,562 Pneumatic tire with sectional tread shoes of rubber-filled fabric facing, having vacuum cups, hooked on circumferential chain near rim. G. Valliquette, Montreal, Que.
204,584 Parachute. The E. R. Calthrop's Aerial Patents, Limited, assignee of E. R. Calthrop—both of London, England.

GRANTED OCTOBER 12, 1920

204,756 Parachute with launching device. The E. R. Calthrop's Aerial Patents, Limited, assignee of E. R. Calthrop—both of London, England.
204,757 Hard rubber battery jar. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of H. Weida, Highland Park, New Jersey, U. S. A.

GRANTED OCTOBER 19, 1920

204,843 Cap or bonnet formed by inserting elastic in casing of circular piece of material. J. G. Dupont, Chicago, Ill., U. S. A.
204,916 Rubber protector for soles and heels. H. T. Stephens, London, England.
204,939 Automobile wheel with wooden spokes and metal rim for pneumatic tires. The Baker Wheel & Rim Co., assignee of E. K. Baker—both of Chicago, Ill., U. S. A.

GRANTED OCTOBER 26, 1920

205,003 Pneumatic tire with inflatable inner tube and textile tube composed of hard-baked granulated cork in canvas casing, with sponge rubber between tubes and air-space, or solid rubber filling remaining space around tubes. J. A. Andrews, Liverpool, England.
205,004 Rubber heel with wearing plate. J. T. Ashton, Bristol, Rhode Island, U. S. A.
204,081 Garter. C. W. Noyes, Newton, administrator of the estate of R. Gorton, deceased, Brookline—both in Mass., U. S. A.
205,082 Garter. C. W. Noyes, Newton, administrator of the estate of R. Gorton, deceased, Brookline—both in Mass., U. S. A.
205,124 Dental suction plate with detachable suction cup. G. S. Whitaker, Gloversville, New York, U. S. A.

THE UNITED KINGDOM

PUBLISHED SEPTEMBER 22, 1920

146,632 Fountain pen. A. E. Wade, 65 Cavendish Drive, Rock Ferry, Cheshire.
146,717 Rubber heel or sole with central solid member and side stud members. H. Broomfield, Market street, Manchester.
146,720 Wound-drainage appliances. G. S. Thompson, Glenelg, Carr street, Randwick, near Sydney, Australia.
146,723 Pessary. G. J. Wallace (née Jamieson), 69 Hamilton Terrace, St. John's Wood, London.
146,728 Golf ball with solid core of semi-vulcanite and outer covering of solid rubber in elastic state. W. Millar, 47 Waterloo street, Glasgow.
146,742 Trouser-protectors of leather, rubber, etc. C. C. Hoggett, 8 High street, Leicester.
146,760 Infant's soother. J. T. Callaway, 10 Ladbroke Square, Notting Hill Gate, London.
146,776 Rectal plug. R. Kirchhoff, 14 Hohenzollern strasse, Stuttgart, Germany.
146,823 Respiratory appliance. A. B. Drager, trading as and assignee of Dragerwerk H. & B. Drager—both of Finkenberg, Lubeck, Germany. (Net yet accepted.)
146,842 Respiratory appliance. A. B. Drager, trading as and assignee of Dragerwerk H. & B. Drager—both of Finkenberg, Lubeck, Germany. (Not yet accepted.)
146,846 Respiratory appliance. A. B. Drager, trading as and assignee of Dragerwerk H. & B. Drager—both of Finkenberg, Lubeck, Germany. (Not yet accepted.)
146,850 Respiratory appliance. A. B. Drager, Finkenberg, Lubeck, Germany. (Not yet accepted.)
146,855 Respiratory appliance. A. B. Drager, trading as and assignee of Dragerwerk H. & B. Drager—both of Finkenberg, Lubeck, Germany. (Not yet accepted.)
146,862 Breathing apparatus. A. B. Drager, trading as and assignee of Dragerwerk H. & B. Drager—both of Finkenberg, Lubeck, Germany. (Not yet accepted.)
146,867 Coated rubber bags containing viscous material, laid between sheets of rubberized fabric, to seal exit aperture made by projectiles from tanks. E. Friant, 11 boulevard de Clichy, Paris. (Not yet accepted.)
146,875 Apparatus for detecting small punctures in tires. P. J. O'Sullivan, Boys' School, Kanturk, County Cork. (Not yet accepted.)

PUBLISHED SEPTEMBER 29, 1920

147,031 Respiratory appliance. A. B. Drager, Finkenberg, Lubeck, Germany. (Not yet accepted.)
147,039 Pneumatic tire. L. H. Ferguson, Ithaca, New York, U. S. A. (Not yet accepted.)
147,053 Tire valves. E. Bellan, 139 *bis* avenue Villiers, Paris. (Not yet accepted.)
147,122 Tire rim. L. Lewkowicz and L. Jouet—both of 2 Faubourg Poissonniere, Paris. (Not yet accepted.)
147,155 Inflating valve for pillows and mattresses. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of R. H. Henemier, 5000 Broadway, New York City—both in New York, U. S. A. (Not yet accepted.)
147,156 Tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, assignee of R. H. Henemier, 5000 Broadway, New York City—both in New York, U. S. A. (Not yet accepted.)
147,157 Pressure gage for tires. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of M. C. Schweirert, 42 Riverside Drive, New York City, and H. P. Kraft, 219 Godwin avenue, Ridgewood, N. J.—all in U. S. A. (Not yet accepted.)
147,158 Tire valve. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of E. V. A. Myers, 82 Evergreen Place, East Orange, N. J.—both in U. S. A. (Not yet accepted.)
147,159 Pressure gage for tire. A. Schrader's Son, Inc., 783 Atlantic avenue, Brooklyn, N. Y., assignee of H. P. Kraft, Ridgewood, N. J.—both in U. S. A. (Not yet accepted.)
147,160 Rubberized fabric stays for aircraft, etc. The Goodyear Tire & Rubber Co., 1144 East Market street, assignee of R. H. Upson, 219 Shawnee Path—both of Akron, Ohio, U. S. A. (Not yet accepted.)
147,161 Sectional dirigible balloon, each section having ballonet. The Goodyear Tire & Rubber Co., 1144 East Market street, assignee of R. H. Upson, 219 Shawnee Path—both of Akron, Ohio, U. S. A. (Not yet accepted.)
147,162 Device for strengthening nose of dirigible or similar balloon. The Goodyear Tire & Rubber Co., 1144 East Market street, assignee of R. H. Upson, 219 Shawnee Path—both of Akron, Ohio, U. S. A. (Not yet accepted.)
147,163 Longitudinal compression members for strengthening the gas-bags of dirigibles, kite balloons, etc. The Goodyear Tire & Rubber Co., 1144 East Market street, assignee of R. H. Upson, 219 Shawnee Path—both of Akron, Ohio, U. S. A. (Not yet accepted.)
147,233 Hot-water bottle or ice-bag fitted with an inwardly-extending flange for holding a compress. T. Cotton, 5 Russell Road, Whalley Range, Manchester, England; J. W. Appleton, 353 Fifth avenue, New York City, U. S. A.
147,324 Inflating valve for units of sectional pneumatic tire. L. Hayden, 336 Romford Road, Forest Gate, London.

GERMANY

PATENTS ISSUED, WITH DATE OF ISSUE

328,460 (September 4, 1919.) Method for the manufacture of a rubber sucker with valve extension. Hermann Grimmelmann, Wallisellen, Zurich, Switzerland.
329,404 (July 29, 1919.) Rubber heel with metal supports. Bruno Schmidt, 19 Huttonstrasse, Dresden.

TRADE MARKS

THE UNITED STATES

NO. 131,583 The word MONEY BABK—tube and casing patches and patch kits. Money Back Laboratories, Inc., Oklahoma, Okla.
131,584 Representation of comic figure carrying patched tire and can of patches and having patches on seat of trousers bearing the words MONEY BACK TUBE PATCH, MONEY BACK CASING PATCH—tube and casing patches and patch kits. Money Back Laboratories, Inc., Oklahoma, Okla.
131,585 Representation of comic figure carrying patched tire and can of patches and having patches on seat of trousers bearing the words MONEY BACK TUBE PATCH, MONEY BACK CASING PATCH, the head of the figure superimposed against the bottom of the words MONEY BACK in large letters—tube and casing patches and patch kits. Money Back Laboratories, Inc., Oklahoma, Okla.
131,952 The word KOHINOOR—belts made of rubber reinforced with fabric. The B. F. Goodrich Co., New York City.
131,958 The word ELBON—hose made of rubber reinforced with fabric and sheet packing having rubber incorporated therein. The B. F. Goodrich Co., New York City.
131,959 The word ELEVAY—elevator belts made of fabric combined with rubber. The B. F. Goodrich Co., New York City.
131,964 The word VOLUNTEER—sheet-packing made wholly or partly of rubber. The B. F. Goodrich Co., New York City.
132,282 A large letter Z containing the letters ONTA under top horizontal stroke—fabric and cord tire casings and inner tubes. Zonta Tire & Rubber Co., Sioux City, Ia.
132,304 In white against a scallop-edged oval black background, the representation of an inner tube and the words SELF WELDING WELDO PATCH, ALL RUBBER, A PATCH THAT HAS NO MATCH—patches for repairing tires, tubes, rubber boots, hot-water bags, etc. H. Greenburg, New York City.
132,675 Representation of a red diamond bearing the word BATTERIES within a horizontal oblong space superimposed above the word ARTHUR in staggered letters against the background—hard rubber storage battery jars, etc. Arthur Storage Battery Supply Co., Chicago, Ill.
132,859 The words VULCO-CURED-TUBE—belting, hose and packing, and tires. The Gates Rubber Company, Denver, Colo.
133,403 The word PERMAPOINT—automatic pencils and fountain pens. Crocker Pen Co., Boston, Mass.
133,617 The word EVERLASTIK—elastic and non-elastic webs. Everlastik, Inc., Boston, Mass.

133,660 Representation of an oval within a diamond bearing the words GOODWILL ANTIMONY HEAVY RED TUBES—inner tubes. Goodwill Rubber Co., Inc., New York City.

133,718 The words SEALTYTE LEAK-PROOF TUBES—pneumatic tires. Victory Rubber Manufacturing Co., Atlanta, Ga.

133,756 Representation of a fist radiating electricity within a circle beneath the word AMELECTRIC, all within a border formed of two concentric circles containing the words AMERICAN ELECTRICAL WORKS, PHILLIPSDALE, R. I.—bare and insulated wire and cables, etc. American Electrical Works, Phillipsdale, R. I.

133,917 The words WHITE TOP—fountain pens. The Evans Dollar Pen Company, Waterloo, Ia.

134,003 The letter A within a spade-spot outline—hard rubber equipment for handling of corrosive chemical solutions, and hard rubber closet seats. American Hard Rubber Co., Hempstead and New York City, N. Y.

134,141 Representation of a circular label bearing Indian girl's head with hair in two braids above the words POCAHONTAS BRAIDS—elastic and other findings. Pocahontas Braid Corporation, New York City.

134,468 The word STAR—massage shower-bath sprays. (See THE INDIA RUBBER WORLD, September 1, 1920, page 818.) The Fitzgerald Manufacturing Co., Torrington, Conn.

134,488 The word Hickory above a representation of a tug-of-war over a garter between a boy and a dog, all within a double outlined oval—garters and hose-supporters. A. Stein & Co., Chicago, Ill.

134,822 Representation of a chevron—rubber tires. International India Rubber Corporation, South Bend, Ind.

134,823 Conventionalized black and white ellipses distorted to a point at one end, fitting into each other and both within a circle—belting, hose, packing, and tires. International India Rubber Corporation, South Bend, Ind.

135,165 The words GORILLA CLINCH with the G extended in a flourish underneath and bearing the words GORILLA CLINCH PATCH—tire patch. E. J. O'Connell, Pittsfield, Massachusetts.

135,176 Representation of outline of a circular life-saver bearing the words DRESS SAVER, above the word SUPREME—dress shields. J. Stein, New York City.

135,297 The word PENCRAFT—fountain pens. The Pencraft Co., Chicago, Ill.

135,329 The words JIFFY JUNIOR—Infants' and children's waterproof underwear and baby-pants. I. B. Kleinert Rubber Company, New York City. (See also THE INDIA RUBBER WORLD, December 1, 1919, page 157.)

135,336 Representation of a Marathon runner dividing the word MARATHON on a label—rubber supporting belts. The Marathon Tire & Rubber Company, Cuyahoga Falls, Ohio.

135,530 The words TRU-MATIC—tires. True-Matic Tire and Tube Co., Wilmington, Del., and Wellington, O.

THE DOMINION OF CANADA

REGISTERED WEEK ENDED SEPTEMBER 14, 1920

27,118 The word SHAMROCK in combination with the representation of three shamrocks against a black background within a circle—pneumatic tires and tubes. G. M. Costello, Philadelphia, Pa., U. S. A.

27,119 The word PERFECTION—suspenders. The Montreal Suspender & Umbrella Manufacturing Co., Limited, Montreal, Que.

27,149 The word MERITAS and a monogram of the letters S. T. P. Co.—waterproofed fabrics, substitutes for rubber or rubberized cloth, sheets, etc. The standard Textile Products Co., New York City, U. S. A.

27,155 Representation of oval frame bearing at the top the name: CANADIAN CONSOLIDATED RUBBER CO., LIMITED, and at the bottom: AND ASSOCIATED COMPANIES; in the center, the representation of a beaver gnawing a maple log; above, the words: DOMINION RUBBER SYSTEM—rubber boots and shoes, tires and tubes, belting, hose, and packing, gaskets, valves, matting, water-bottles, tobacco pouches, gloves, raincoats, etc. Canadian Consolidated Rubber Co., Limited, Montreal, Que.

REGISTERED WEEK ENDED SEPTEMBER 21, 1920

27,166 The words SQUARE DEAL—rubber boots and shoes, bands, garden hose, bicycle tires, inner tubes for automobile tires, etc. Goodyear Rubber Co., New York City, U. S. A.

27,169 The word SCOOP—rubber footwear and parts, including soles and heels. Gutta Percha and Rubber, Limited, Toronto, Ont. (See THE INDIA RUBBER WORLD, October 1, 1920, page 35.)

27,183 The word CRESCENT—fountain pens. The Conklin Pen Manufacturing Co., Toledo, Ohio, U. S. A.

27,184 The word CONKLIN—fountain pens. The Conklin Pen Manufacturing Co., Toledo, Ohio, U. S. A.

27,191 The word FALLS and the representation of a waterfall, enclosed within a shield-shaped outline—rubber and rubber and fabric tires, inner tubes, casings, shoes, patches, etc. The Falls Rubber Co., Cuyahoga, Ohio, U. S. A.

REGISTERED WEEK ENDED SEPTEMBER 28, 1920

27,202 The word GEMCO—automobile accessories, including tire display stands, valve tools, tire holders, brake bands, etc. Gemco Manufacturing Co., Milwaukee, Wis., U. S. A.

27,208 The word ELEPHANT—tires, tubes, and other rubber motor accessories. Prudential Bond and Security Co., Toronto, Ont.

27,209 The representation of two elephants pulling in opposite directions on an automobile tire on which are inscribed the words: LEFANT TIRES ARE STRONG TIRES—tires, tubes, and other rubber motor accessories. Prudential Bond and Security Co., Toronto, Ont.

27,214 The word LOCKTITE—patches for pneumatic tires, water-bottles, boots, etc. Locktite Patch Co., Detroit, Mich., U. S. A.

THE UNITED KINGDOM

403,268 Representation of a label bearing figures of children playing with balloons and the words SEALED SANITARY PACKAGE, RELIANCE SEAMLESS SAFE COLOURED TOY BALLOONS MAKE EVERYBODY HAPPY—rubber toy balloons. Reliance Rubber Co., Limited, 212-213 Upper Thames street, London, E. C. 4.

403,525 The word MAJESTIC—rubber and gutta percha goods, not included in classes other than No. 40. The Majestic Tire & Rubber Co., 28 South Cruse street, Indianapolis, Ind., U. S. A.; address for service in the United Kingdom, care of Haseltine, Lake & Co., 28 Southampton Buildings, London, W. C. 2.

403,560 The words BOW BELLS above representation of three bells being rung, all above the words TRADE MARK—rubber and gutta percha goods not included in classes other than No. 40. Copestake, Crampton & Co., 5 Bow Church Yard, London, E. C. 4.

403,564 The word INDUNA—articles of clothing. The South African Rubber Manufacturing Co., Limited, Howick, Natal, South Africa; address for service in the United Kingdom, care of J. P. O'Donnell & Co., 14-15 Conduit street, London, W. 1.

403,565 The word INDUNA—rubber and gutta percha goods not included in classes other than No. 40. The South African Rubber Manufacturing Co., Limited, Howick, Natal, South Africa address for service in the United Kingdom, care of J. P O'Donnell & Co., 14-15 Conduit street, London, W. 1.

403,566 The word INDUNA—games of all kinds and sporting goods not included in classes other than No. 49. The South African Rubber Manufacturing Co., Limited, Howick, Natal, South Africa; address for service in the United Kingdom, care of J. P. O'Donnell & Co., 14-15 Conduit street, London, W. 1.

403,622 Within the representation of a tire the figure of a man standing under a tree—crude, waste or reclaimed rubber. G. S. Moulton & Co., Limited, and Wood-Milne, Limited, 2 Central Buildings, Westminster, London, S. W. 1.

403,652 Representation of a tire divided into quarters and within each quarter, representations, respectively, of a boll of cotton, six bobbins of cotton, a roll of cotton warp, and a square of fabric warp and filling—rubber and gutta percha goods not included in classes other than No. 40. Federated Textiles, Limited, 2 Central Buildings, Westminster, London, S. W. 1.

403,807 The word RECO—rubber tires H. C. W. Beeching, trading as Ripley, Strong & Co., Farnborough road, Farnborough, Hampshire.

403,843 Representation of head of an Indian chief and the letters B, A and T arranged around it in a triangle—rubber tobacco pouches. British-American Tobacco Co., Limited, Westminster House, 7 Millbank, London, S. W. 1.

403,997B The word INTERNATIONAL—motor tires, covers and inner tubes, all of rubber. International Tyres, Limited, 7 Lower Belgrave street, Victoria, London, S. W. 1.

404,231 The word MUSTIKON—puncture studs, valve seaters and solution. Mustikon, Limited, 20 New street, Cardiff.

404,374 The word BIRSCO—rubber and gutta percha goods not included in classes other than No. 40. A. Mallaby, trading as The British India-Rubber Sponge Company, 4 Malbow street, Manchester road, Bradford, Yorkshire.

DESIGNS.

THE UNITED STATES

NO. 56,345 Rubber pad for shoe soles. Patented October 5, 1920, Term 7 years. D. H. Eley and T. H. Ryan, assignors to The Emory Rubber Sole Co., Inc.—all of Norfolk, Va.

56,358 Elastic fabric. Patented October 5, 1920. Term 14 years. V. Guinsburg, assignor to I. B. Kleinert Rubber Co.—both of New York City. (See also page 183 of this issue.)

56,389 Heel. Patented October 5, 1920. Term 14 years. J. H. Stedman, Braintree, Mass.

56,398 Rubber heel. Patented October 5, 1920. Term 14 years. G. C. Wood, Boston, Mass., assignor to Wids Co., St. Paul, Minn.

56,413 Tire. Patented October 26, 1920. Term 14 years. J. G. Bretson, assignor to The Phoenix Rubber Co.—both of Akron, O.

THE DOMINION OF CANADA

4,878 Rubber heel. Patented September 11, 1920. Canadian Consolidated Rubber Co., Limited, Montreal, Que.

4,888 Tire. Patented September 29, 1920. R. S. Smart, Ottawa, Ont.

4,889 Tire. Patented September 29, 1920. R. S. Smart, Ottawa, Ont.

4,890 Tire tread. Patented September 29, 1920. K. & S. Tire & Rubber Goods, Limited, Toronto, Ont.

4,899 Rubber mat. Patented October 11, 1920. R. S. Smart, Ottawa, Ont.

4,909 Suspender. Patented October 12, 1920. T. H. Paul, Toronto, Ont.

GERMANY

DESIGN PATENTS ISSUED, WITH DATE OF ISSUE

750,620 (August 17, 1920.) Exchangeable rubber heel. Hans Meyer, 23 Stoppenbergerstrasse, Essen-Ruhr.

751,316 (March 26, 1920.) Holder for rubber denture for artificial teeth during vulcanization. Hans Wetzler, 14 Geleitstrasse, Offenbach-on-the-Main.

751,553 (May 6, 1920.) Appliance for the manufacture of inlays of pneumatic tire covers. W. & A. Bates, Limited, and John Healey, Leicester, and Franz Shaw & Co., Limited, Manchester—both in England.

751,753 (August 18, 1920.) Rubber toy ball. Rheinische Gummi and Celluloidfabrik, Mannheim-Neckarau.

751,784 (March 12, 1919.) Automobile tire. Josef Planck, 8 Thielenstrasse, Bielefeld.

751,896 (August 13, 1920.) Appliance for the repair of broken garden hose. Artur Glodde, 17 Frobelstrasse, Berlin.

752,282 (April 19, 1919.) Protector for defective tire covers. Franz Laemmel, Gornsdorf, Erzgeb.

752,302 (June 22, 1920.) Appliance for repair of pneumatic tires. Georg Boeker and Julius Kullatkowsky, Leipzig.

752,321 (August 9, 1920.) Textile shoes with vulcanized leather or rubber sole. S. Stifelsen, 8 Hohenstaufenstrasse, Frankfort-on-the-Main.

752,374 (February 3, 1920.) Tire. Paul Marten, 127 Berlinerstrasse, Berlin-Friedrichsfelde.

752,521 (July 23, 1918.) Tire. Helmut Kuentzal, 49 Sonnbornstrasse, Duesseldorf-Gerresheim.

752,956 (August 5, 1920.) Vulcanizing apparatus. P. Neuburg, 17 Friedrichstrasse, Köln.

Review of the Crude Rubber Market

NEW YORK

DEPRESSION has been the dominant feature of the crude rubber market that continues to be obsessed by forced liquidation of speculative and weak financial traders. During the past three months there have occurred many such failures whose rubber commitments would have been thrown on the market with disastrous results but for the generous support of the large importers and dealers.

Pronounced weakness continued throughout the month, resulting in daily fractional declines that established the lowest prices on record for standard plantation rubber. First latex spot sold for 18 cents, and ribbed smoked sheets for 17 cents. Low records were made in futures. January-March deliveries of first latex were quoted at 22 cents and ribbed smoked sheets were 20½ cents for the same position. Parás were freely offered, but lacked demand. Upriver fine made a low record of 22 cents.

While buyers have been scarce and sellers rather shy, considerable factory business has been done in a small way in various future positions, and spot stocks were brought in at bargain prices and stored. The lower grades of crude rubber have been weak with the exception of guayule that was comparatively firm. Balata has shown strength due to the demand by golf ball manufacturers, and the holding of supplies in primary sources.

Until the manufacturers show a real buying interest in the market there is no reason to expect other conditions than the present. The change will come when tire manufacturing again becomes normal and the large stocks of rubber that are now on hand will be made into rubber goods. There are optimists who believe that the rubber industry will be in full swing by April 1.

The October, 1920, arrivals of 10,639 tons were the lowest monthly imports in two years, showing that shipments are being held at primary sources. It is estimated that 9,000 tons will arrive in November. The imports for October, 1919, were 28,888 tons. For the ten months ended October 31, 1920, 203,612 tons were imported compared with 185,684 tons for the same period in 1919.

Spot and future quotations in standard plantation and Brazilian sorts at the first and last of the past month were as follows:

PLANTATIONS. November 1, first latex crêpe, 21 to 22 cents; January-March, 24½ cents; April-June, 25 cents.

November 24, first latex crêpe, 19 cents; January-March, 22½ cents; April-June, 25½ cents.

November 1, ribbed smoked sheets, 19½ to 20 cents; January-March, 23 cents; April-June, 24 cents.

November 24, ribbed smoked sheets, 17½ cents; January-March, 21 cents; April-June, 24 cents.

November 1, No. 1, amber crêpe, 19 cents.

November 24, No. 1 amber crêpe, 16½ cents.

November 1, No. 1, rolled brown crêpe, 15 cents.

November 24, No. 1 rolled brown crêpe, 14 cents.

SOUTH AMERICAN PARÁS AND CAUCHO. November 1, upriver fine, 23½ to 24 cents; islands fine, 19 to 20 cents; upriver coarse, 15 to 16 cents; islands coarse, 15 to 16 cents; Cametá coarse, 13¾ to 14½ cents; caucho ball, 15 to 16 cents.

November 24, upriver fine, 21 cents; islands fine, 19½ cents; upriver coarse, 15½ cents; islands coarse, 14 cents; Cametá coarse, 14 cents; caucho ball 10 to 16 cents.

NEW YORK QUOTATIONS

Following are the New York spot quotations, for one year ago, one month ago, and November 24, the current date:

	December 1, 1919	November 1, 1920	November 24, 1920
PLANTATION HEVEA—			
First latex crêpe	$0.52 @	$0.21 @.22	$0.19 @
Amber crêpe No. 1	.51 @	.19 @	.16½ @
Amber crêpe No. 2	.50 @	.18 @	.15½ @
Amber crêpe No. 3	.49 @	.17 @	.14½ @
Amber crêpe No. 4	.47 @	.16 @	.13½ @
Brown crêpe, thick and thin	.47 @	.18 @	.15 @
Brown crêpe, specky	.45 @	.15 @	.15 @.14½
Brown crêpe, rolled	.43 @	.15 @	.14 @
Smoked sheet, ribbed, standard quality	.57¼ @	.19½ @.20	.17½ @
Smoked sheet, plain standard quality	.54 @	.18½ @	.16 @
Unsmoked sheet, standard quality	.52 @	.17½ @	.15 @
Colombo scrap No. 1	.35 @	.16 @	.13 @
Colombo scrap No. 2	.34 @	.15 @	.12 @
EAST INDIAN—			
Assam crêpe	.49 @	@	@
Assam onions	.49 @	@	@
Penang black scrap	@	@	@
PONTIANAK—			
Banjermassin	.11½ @.14	.09 @	.07½ @
Palembang	.13 @	@	.08 @
Pressed block	.24 @.27	.18 @	.15½ @
Sarawak	.11 @	@	.07 @
SOUTH AMERICAN—			
PARAS—			
Upriver, fine	.49 @.50	.23½ @.24	.20 @.21
Upriver, medium	@	.20 @	.17 @
Upriver, coarse	.36 @	.15 @.16	.15½ @
Upriver, weak, fine	.40 @	.17 @	.15 @.16
Islands, fine	.47½ @.48	.19 @.20	.19½ @
Islands, medium	.47 @.48	.19 @	*.14 @
Islands, coarse	.22 @.23	.15 @	.14 @.14½
Cametá, coarse	.22 @	.14 @	.14 @
Madeira, fine	.51 @.51½	.29 @	.24 @.25
Acre Bolivian, fine	.51 @.51½	.25 @	.20 @.21½
Peruvian, fine	.50 @	.22 @	.18 @.19
Tapajos, fine	.50 @	.21 @	.19 @
CAUCHO—			
Upper caucho ball	.34 @.35	.16 @	.16 @.16½
Lower caucho ball	.32 @.34	.15 @	.10 @.10½
MANICOBAS—			
Ceará negro heads	@	*.18 @	.14 @
Ceará scrap	@	*.10 @	.06 @
Manicoba, 30% guarantee	@	*.15 @	.11 @
Mangabeira thin sheet	@	*.20 @	.18 @
CENTRALS—			
Corinto scrap	$0.34 @$0.34½	@	$0.12 @
Esmeralda sausage	.34 @.34½	@	.12 @
Central scrap	.33 @	@	.12 @
Central scrap and strip	.32 @.32½	@	.10 @
Central wet sheet	.22 @.23	@	.07 @
Guayule, 20% guarantee	.23 @	.25 @	*.20 @
Guayule, washed and dried	.38 @	.37 @	*.30 @
AFRICANS—			
Niger flake, prime	.18 @	@	@
Benguela, extra No. 1, 28%	@	@	@
Benguela, No. 2, 32½%	@	@	.09 @
Conakry niggers	@	@	@
Congo prime, black upper	.37 @	@	@
Congo, prime, red upper	@	@	@
Kassai, black	.37 @	@	@
Kassai, red	@	@	@
Massai sheets and strings	@	@	@
Rio Nunez ball	@	@	@
Rio Nunez sheets and strings	@	@	@
GUTTA PERCHA—			
Gutta Siak	.25 @	.19 @	.17 @.18
Red Macassar	2.85 @	2.90 @	2.25 @2.90
BALATA—			
Block, Ciudad Bolivar	.60 @.64	.70 @	.70 @
Colombia	.53 @.55	.46 @	.47 @.48
Panama	.43 @.45	.33 @	@
Surinam sheet	.88 @	.70 @	.72 @.73
amber	.90 @	.76 @	.80 @

* Nominal.

RECLAIMED RUBBER

The continued depressed state of the rubber manufacturing industry generally, together with the unprecedented low levels ruling for crude rubber, has entirely eliminated the demand for reclaims and practically obliterated the market on all grades.

Such reclaiming plants as are in operation are producing only an inconsiderable fraction of their normal output. A change for the better, it is thought, may come early in the approaching new year.

The following quotations are nominal and are the same as reported for September 27 and October 26:

NEW YORK QUOTATIONS

NOVEMBER 24, 1920

Prices subject to change without notice

STANDARD RECLAIMS

Floating	*$0.22	@	$0.24
Friction	.25	@	.30
Mechanical	.11	@	.12
Shoe	.14¾	@	.15½
Tires, auto	.14½	@	.15
truck	.12½	@	.13½
White	.20	@	.21

*Nominal.

THE MARKET FOR COMMERCIAL PAPER

In regard to the financial situation, Albert B. Beers, broker in crude rubber and commercial paper, No. 1 Liberty street, New York City, advises as follows:

"During November the demand for paper has been light, about the same as October, and almost entirely from out-of-town banks, ruling rates being 8½ to 9 per cent for the usual run of rubber names, and some going as high as 9½ per cent."

COMPARATIVE HIGH AND LOW NEW YORK SPOT RUBBER PRICES

	November 1920*		November 1919		November 1918	
PLANTATIONS—						
First latex crêpe	$0.21½	@$0.18½	$0.54½	@$0.53	$0.63	@$0.41
Smoked sheet ribbed	.20	@ .17½	.54	@ .52	.61½	@ .46
PARAS—						
Upriver, fine	.23¾	@ .20½	.52	@ .49	.68	@ .57½
Upriver, coarse	.15½	@ .14½	.35	@ .34½	.40	@ .31
Islands, fine	.20	@ .18½	.48½	@ .48	.59	@ .44
Islands, coarse	.14½	@ .14	.23½	@ .21½	.27	@ .21½
Cametá	.14½	@ .13	.23	@ .23	.28	@ .21

*Figured to November 26, 1920.

ANTWERP RUBBER MARKET

GRISAR & CO., Antwerp, report [November 5, 1920]:

The market tendency continues to be weak. After various fluctuations, the market closed with prices slightly higher. Spot, November, 1*s.* 2*d.*—1*s.* 4*d.*; December, 1*s.* 2*d.*; January-March, 1*s.* 3*d.*—1*s.* 4*d.*; January-June, 1*s.* 4*d.*; Pará, 1*s.* 4*d.*—1*s.* 5*d.*

Statistics for the week were as follows: Arrivals, 2,611 tons; sales, 694 tons; stocks, 41,751 tons against 25,353 tons in 1919. Statistics for the close of October: London—imports, 9,265 tons; sales, 3,028 tons; stocks, 41,748 tons against 24,978 tons in 1919. Arrivals, by the *Albertville*, 193,436 tons. Stock on hand this day: 1,478 tons.

Interest in the futures market remains nil; the rate of exchange is lower by 0.25 francs. Transactions amounted to 5,000 kilos. Closing quotations, each month: November-May, 8.75; June-October, 8.75. Tendency, quiet.

AMSTERDAM RUBBER MARKET

JOOSTEN & JANSSEN, Amsterdam, report [October 29, 1920]:

The dull tendency on the rubber market continued without interruption. Nevertheless, a good business was done here in spot parcels of various qualities.

Hevea standard crêpe brought f. .88½; sheets, f. .82. On the terminal market the turnover was very small, and prices remained unchanged and nominal.

The final prices were about f. .86 for *Hevea* standard crêpe and f. .80 for spot sheets, crêpe January-March f. .92, April-June, f. .98 rather sellers, with buyers at about 2 cents lower.

CEYLON RUBBER IMPORTS AND EXPORTS

IMPORTS

		January 1 to October 18 1919	1920
Crude rubber:			
From Straits Settlements	*pounds*	2,172,183	2,139,185
India		1,231,016	1,211,833
Burma and other countries		.....	26,259
Totals	*pounds*	3,403,199	3,377,277

EXPORTS

Crude rubber:			
To United Kingdom	*pounds*	22,212,288	32,912,097
Belgium		29,120	169,550
France		383,400	613,334
Germany		.....	300,592
Netherlands		.....	22,730
Italy		.....	224,000
Spain		13	.....
Australia		.....	56
Victoria		98,755	253,236
United States		47,779,583	29,188,164
New South Wales		154,212	400,092
Canada and Newfoundland		668,294	425,600
India		2,313	736
Straits Settlements		454	44,800
Japan		262,947	177,845
Totals	*pounds*	71,591,379	64,732,832

Compiled by the Ceylon Chamber of Commerce.

SINGAPORE RUBBER MARKET

GUTHRIE & CO., LIMITED, Singapore, report [October 14, 1920]:

The weekly rubber auction held yesterday and today was marked by a steady demand and an improvement in prices. The sale opened quietly at crêpe 58½, sheet 51 cents, but owing to keen competition for standard grades, values improved later to crêpe 60½, sheet 54 cents, an advance of 3 cents on the week. Off quality lots of crêpe and sheet were in strong demand, and a large quantity of this grade was sold at reasonably good prices. Browns were scarce and steady round about last week's prices; dark and barky crêpes improved slightly.

Of 997 tons catalogd, 545 tons were sold.

The following is the course of values:

	In Singapore per Pound[1]			Sterling Equivalent per pound in London		
Sheet, fine ribbed smoked	51c	@	54c	1/ 4⅝	@	1/ 5½
Sheet, good ribbed smoked	38	@	50½	1/ 1	@	1/ 4½
Crêpe, fine pale	58½	@	60	1/ 7¼	@	1/ 7¾
Crêpe, good pale	43	@	58	1/ 2⅞	@	1/ 7⅛
Crêpe, fine brown	34½	@	42	1/ 0½	@	1/ 2⅝
Crêpe, good brown	27	@	34	—/10¾	@	1/ 0⅜
Crêpe, dark	22½	@	30	—/ 9⅝	@	—/11¼
Crêpe, bark	18	@	27½	—/ 7⅞	@	—/10½

[1] Quoted in Straits Settlements, currency $1 = $0.567 United States currency.

PLANTATION RUBBER FROM THE FAR EAST

TOTAL EXPORTS FROM MALAYA

From January 1, 1920 to dates named, excluding all foreign transshipments. Reported by Barlow & Co., Singapore.

To—	From Singapore, August 31, 1920	Malaca, August 31, 1920	Penang, August 31, 1920	Port Swettenham, August 31, 1920	Totals
United Kingdom *lbs.*	36,884,082	2,142,507	20,609,467	17,769,218	77,405,274
The Continent	5,920,606	.....	398,400	150,007	6,469,013
Japan	8,043,804	.....	2,277	.....	8,046,081
Ceylon	10,299	.....	328,134	1,198,245	1,536,678
U. S. A. and Canada	186,719,529	42,214	16,353,857	.....	203,115,600
Australia	438,294	.....	.....	.....	438,294
Other countries	123,200	.....	400	.....	123,600
Totals	238,139,814	2,184,721	37,692,535	19,117,470	297,134,540
For the year 1919	352,338,000	17,849,500	25,779,500	30,805,166	426,772,166
For the year 1918	225,100,000	837,600	12,479,200	.....	238,416,800
For the year 1917	177,901,200	15,113,200	23,402,000	.....	216,416,400
For the year 1916	135,535,954	7,167,346	30,643,565	3,660,840	177,007,705
For the year 1915	86,067,657	7,898,984	28,580,663	821,445	123,368,749
For the year 1914	43,534,177	5,218,379	21,912,567	2,052,620	72,717,743

STRAITS SETTLEMENTS RUBBER EXPORTS

An official report from Singapore states that the exports of rubber from Straits Settlements ports in the month of September amounted to 9,791 tons (transhipments, 1,416 tons) as compared with 6,673 tons in August and 10,476 tons in the corresponding month last year. The total export to the end of September was 100,720 tons, as against 109,952 tons last year, and 51,616 tons in 1918. Appended are the comparative statistics:

		1918	1919	1920
January	*tons*	4,302	14,404	13,125
February		2,334	15,661	17,379
March		8,858	20,908	5,931
April		6,584	10,848	9,768
May		13,587	15,845	15,617
June		6,515	5,059	11,663
July		1,978	7,818	10,773
August		1,249	8,933	6,673
September		6,209	10,476	9,791
Totals	*tons*	51,616	109,952	100,720

FEDERATED MALAY STATES RUBBER EXPORTS

An official report from Kuala Lumpur gives the exports of rubber from the Federated Malay States during the month of September as 7,604 tons compared with 9,140 tons in August, and 9,841 tons in the corresponding month last year. The total exports for nine months of the current year amount to 80,262 tons against 79,824 tons in 1919 and 58,142 tons in 1918. Appended are the comparative statistics:

		1918	1919	1920
January	*tons*	7,588	7,163	11,119
February		6,820	10,809	9,781
March		7,709	10,679	9,524
April		7,428	7,664	8,375
May		5,851	7,308	7,627
June		5,161	7,094	9,049
July		5,706	8,640	8,043
August		5,291	10,626	9,140
September		6,588	9,841	7,604
Total	*tons*	58,142	79,824	80,262

RUBBER EXPORTS FROM PENANG

		January 1 to September 21 1919	1920
To Great Britain	*piculs*[1]	192,703	182,703
Europe		3,574	3,578
United States		132,262	132,262
Totals	*piculs*	328,539	318,543

[1] One picul equals 133⅓ pounds.

PLANTATION RUBBER EXPORTS FROM JAVA

	August		Eight Months Ended August 31	
	1919	1920	1919	1920
To Netherlands .....kilos	*	524,000	*	3,133,000
Great Britain	177,000	392,000	4,781,000	5,106,000
Germany	*	10,000	*	70,000
France	*	.....	*	11,000
Belgium	*	17,000	*	31,000
Other European destinations	567,000**	.....	1,158,000**	.....
United States	1,013,000	400,000	11,578,000	9,505,000
Singapore	494,000	299,000	3,580,000	2,970,000
Japan	.....	.....	180,000	184,000
Australia	*	27,000	*	190,000
Other countries	76,000**	.....	278,000**	.....
Totals .....kilos	2,327,000	1,669,000	21,555,000	21,200,000
Ports of origin:				
Tandjong Priok	1,583,000	738,000	11,700,000	9,936,000
Samarang	27,000	23,000	345,000	303,000
Soerabaya	682,000	785,000	8,751,000	10,249,000

* Details not given in 1919.
** Not specified in 1919.

CRUDE RUBBER ARRIVALS AT ATLANTIC AND PACIFIC PORTS AS STATED BY SHIPS' MANIFESTS

PARAS AND CAUCHO AT NEW YORK

	Fine	Medium	Coarse	Caucho	Totals Pounds
OCTOBER 25. By the S. S. *Gregory*, from Iquitos.					
Ultramares Corp.	.....	.....	.....	.....	8,016
W. R. Grace & Co.	.....	.....	.....	.....	9,898
OCTOBER 25. By the S. S. *Gregory*, from Bolivia.					
William Schall & Co.	26,815	.....	.....	.....	26,815
OCTOBER 25. By the S. S. *Gregory*, from Manáos.					
General Rubber Co.	.....	.....	.....	.....	6,174
Poel & Kelly	.....	.....	.....	.....	3,234
W. R. Grace & Co.	.....	.....	.....	.....	7,448
Meyer & Brown, Inc.	235,200	.....	.....	.....	235,200
OCTOBER 25. By the S. S. *Gregory*, from Pará.					
Poel & Kelly	.....	.....	.....	.....	4,704
William Schall & Co.	.....	.....	.....	.....	19,600
Various	.....	.....	.....	.....	88,886
OCTOBER 25. By the S. S. *Floridian*, from Montevideo.					
Neuss, Hesslein & Co.	.....	.....	.....	.....	20,580
OCTOBER 25. By the S. S. *Archimedes*, from Montevideo.					
Poel & Kelly	6,468	196	1,656	.....	8,320
Various	9,310	588	10,290	.....	20,188
NOVEMBER 8. By the S. S. *Benevente*, from Rio de Janeiro.					
Various	38,906	98	5,586	21,268	65,858
NOVEMBER 8. By the S. S. *Aidan*, from Pará.					
General Rubber Co.	.....	.....	.....	.....	41,964
Poel & Kelly	.....	.....	.....	.....	19,600
William Schall & Co.	42,445	.....	.....	.....	42,445
Amsinck & Co., Inc.	.....	.....	.....	.....	26,656
Paul Bertuch	.....	.....	12,368	17,460	29,828
NOVEMBER 8. By the S. S. *Aidan*, from Manáos.					
Poel & Kelly	.....	.....	.....	.....	7,646
Various	.....	.....	.....	.....	203,154
NOVEMBER 16. By the S. S. *Nasmyth*, from Pará.					
General Rubber Co.	.....	.....	5,490	.....	5,490
Poel & Kelly	.....	294	3,920	.....	4,214
Various	.....	.....	5,488	.....	5,488

PLANTATIONS

(*Figured* 180 *pounds to the bale or case*)

	Shipment from:	Shipped to:	Pounds.	Totals.
OCTOBER 22. By the S. S. *Tatsuno Maru*, at New York.				
Chas. T. Wilson Co., Inc.	Colombo	New York	20,160	
Thornett & Fehr, Inc.	Colombo	New York	14,580	
Aldens' Successors, Inc.	Colombo	New York	10,440	
Poel & Kelly	Colombo	New York	72,360	
L. Littlejohn & Co., Inc.	Colombo	New York	112,000	
Hood Rubber Co.	Colombo	Watertown	11,390	
Various	Colombo	New York	30,400	271,330
OCTOBER 23. By the S. S. *Lowther Castle*, at New York.				
Hood Rubber Co.	Singapore	Watertown	246,400	246,400
OCTOBER 27. By the S. S. *Saxonia*, at New York.				
Various	London	New York	87,840	87,840
OCTOBER 28. By the S. S. *Sydic*, at New York.				
Hood Rubber Co.	Colombo	Watertown	37,170	
Pacific Trading Corp. of America	Colombo	New York	113,400	
Thornett & Fehr, Inc.	Colombo	New York	72,600	
Chas. T. Wilson Co., Inc.	Colombo	New York	59,400	
Various	Colombo	New York	19,260	301,230
OCTOBER 29. By the S. S. *West Conob*, at New York.				
The Goodyear Tire & Rubber Co.	Colombo	Akron	51,680	51,680
OCTOBER 29. By the S. S. *Rotterdam*, at New York.				
Meyer & Brown, Inc.	Rotterdam	New York	14,560	14,560
OCTOBER 29. By the S. S. *City of Oran*, at New York.				
Boston Insulated Wire & Cable Co.	Singapore	Dorchester	6,300	
Thornett & Fehr, Inc.	Singapore	New York	20,160	
Irwin-Harrisons & Crosfield, Inc.	Singapore	New York	20,700	
William H. Stiles & Co.	Singapore	New York	100,000	
Edward Boustead & Co.	Penang	New York	28,800	
Thornett & Fehr, Inc.	Penang	New York	9,000	
The Goodyear Tire & Rubber Co.	Penang	Akron	66,600	
F. R. Henderson & Co.	Penang	New York	59,760	
L. Littlejohn & Co., Inc.	Singapore	New York	403,200	
Hood Rubber Co.	Singapore	Watertown	61,700	
General Rubber Co.	Telok Neboeng	New York	924,840	
Irwin-Harrisons Crosfield, Inc.	Telok Neboeng	New York	23,400	
Baird Rubber & Trading Co.	Singapore	New York	201,600	
F. R. Henderson & Co.	Port Dickson	New York	11,880	
Poel & Kelly	Port Dickson	New York	23,940	
Various	Port Dickson	New York	24,300	
Hadden & Co.	Medan	New York	267,120	
Irwin-Harrisons Crosfield, Inc.	Medan	New York	97,380	
Meyer & Brown, Inc.	Singapore	New York	294,560	
Aldens' Successors, Inc.	Medan	New York	21,780	
East Asiatic Co., Inc.	Medan	New York	29,700	
J. T. Johnstone & Co., Inc.	Singapore	New York	170,800	
Fred Stern & Co.	Singapore	New York	399,840	
Various	Singapore	New York	4,600,600	7,867,960
OCTOBER 30. By the S. S. *Celtic*, at New York.				
Dunlop Tire & Rubber Corporation of America.	Liverpool	Buffalo	360	360
OCTOBER 30. By the S. S. *Altai Maru*, at New York.				
Hood Rubber Co.	Singapore	Watertown	336,316	336,316
NOVEMBER 3. By the S. S. *Enggano*, at New York.				
Various	Soerabaya	New York	70,560	70,560
NOVEMBER 4. By the S. S. *Kentucky*, at New York.				
Chas. T. Wilson Co., Inc.	Colombo	New York	66,160	
Whitehall & Co.	Colombo	New York	78,300	
Baring Bros.	Colombo	New York	223,200	
Poel & Kelly	Colombo	New York	42,660	
Meyer & Brown, Inc.	Colombo	New York	224,000	
Baird Rubber & Trading Co.	Calcutta	New York	56,000	
Fred Stern & Co.	Colombo	New York	22,400	
Various	Colombo	New York	226,260	938,980
NOVEMBER 4. By the S. S. *Djember*, at New York.				
The United Malaysian Rubber Co.	Borneo	New York	2,104	
Meyer & Brown, Inc.	Far East	New York	16,800	
Baird Rubber & Trading Co.	Batavia	New York	13,440	
Fred Stern & Co.	Soerabaya	New York	6,720	
The Fisk Rubber Co.	Singapore	Chicopee Falls	13,655	52,719
NOVEMBER 5. By the S. S. *Helekon*, at New York.				
Ultramares Corp.	Pu'to Colombo	New York	15,300	15,300
NOVEMBER 8. By the S. S. *Patroclus*, at New York.				
Hagemeyer Trading Co.	Batavia	New York	69,120	
Peninsular Trading Agency, Inc.	Batavia	New York	14,920	
Fred Stern & Co.	Belawan-Deli	New York	38,139	
Various	Batavia	New York	55,101	177,280
NOVEMBER 8. By the S. S. *Akron*, at New York.				
Baring Bros.	Singapore	New York	137,880	
W. R. Grace & Co.	Singapore	New York	716,040	
Eastern Rubber Co.	Singapore	New York	282,500	
Poel & Kelly	Singapore	New York	119,700	
William H. Stiles & Co.	Singapore	New York	180,000	
Aldens' Successors, Inc.	Soerabaya	New York	4,320	
L. Littlejohn & Co., Inc.	Colombo	New York	204,600	
General Rubber Co.	Belawan	New York	80,460	
Various	Penang	New York	4,860	
Winter, Ross & Co.	Batavia	New York	21,960	
F. R. Henderson & Co.	Batavia	New York	9,720	
Aldens' Successors, Inc.	Batavia	New York	33,480	
Fred Stern & Co.	Batavia	New York	123,200	
Various	Batavia	New York	46,260	
Meyer & Brown, Inc.	Singapore	New York	84,000	
Baird Rubber & Trading Co.	Singapore	New York	56,000	
Various	Singapore	New York	405,000	2,509,980
NOVEMBER 8. By the S. S. *Ningchow*, at New York.				
J. T. Johnstone & Co., Inc.	Singapore	New York	168,000	
East Asiatic Co., Inc.	Port Said	New York	28,800	
Goldman, Sachs & Co.	Port Said	New York	89,100	
Various	Port Said	New York	226,800	
W. R. Grace & Co.	Penang	New York	69,480	
The Goodyear Tire & Rubber Co.	Penang	Akron	86,400	
Meyer & Brown, Inc.	Singapore	New York	483,840	
Aldens' Successors, Inc.	Singapore	New York	61,560	
Balfour, Williamson & Co.	Singapore	New York	89,640	
A. C. Fox & Co.	Singapore	New York	67,680	
Thos. A. Desmond & Co.	Singapore	New York	305,280	

PLANTATIONS—Continued

	Shipment from:	Shipped to:	Pounds.	Totals.
Ajax Rubber Co., Inc....	Singapore	New Brunsw'k	28,800	
Eastern Rubber Co.....	Singapore	New York	99,360	
Poel & Kelly.....	Singapore	New York	41,940	
Mitsui & Co., Limited...	Singapore	New York	103,860	
W. R. Grace & Co.....	Singapore	New York	87,660	
The Fisk Rubber Co....	Singapore	Chicopee Falls	412,160	
William H. Stiles & Co..	Singapore	New York	120,000	
Hood Rubber Co.....	Singapore	Watertown	252,000	
Various	Singapore	Toronto	100,800	
Baird Rubber & Trading Co.	Singapore	New York	239,680	
L. Littlejohn & Co., Inc.	Singapore	New York	168,000	
Fred Stern & Co.....	Singapore	New York	11,200	
Various	Singapore	New York	2,012,000	5,354,040
NOVEMBER 10. By the S. S. *West Calera*, at New York.				
Alfred Kramer & Co....	Colombo	New York	35,640	
Various	Colombo	New York	21,600	57,240
NOVEMBER 10. By the S. S. *Eastern Cross*, at New York.				
Thornett & Fehr, Inc...	Colombo	New York	10,080	
Poel & Kelly.....	Colombo	New York	47,700	
Various	Colombo	New York	118,440	176,220
NOVEMBER 16. By the S. S. *Kandahar*, at Boston.				
Hood Rubber Co.....	Colombo	Watertown	100,800	100,800
NOVEMBER 16. By the S. S. *Eastern Knight*, at New York.				
Thornett & Fehr, Inc...	Colombo	New York	57,600	
L. Littlejohn & Co., Inc.	Colombo	New York	78,606	
W. R. Grace & Co.....	Colombo	New York	164,520	
Various	Colombo	New York	238,200	538,920
NOVEMBER 17. By the S. S. *Lakeville*, at New York.				
Various	Lisbon	New York	126,000	126,000
NOVEMBER 19. By the S. S. *Grace Dollar*, at New York.				
W. R. Grace & Co.....	Singapore	New York	443,340	
Aldens' Successors, Inc..	Singapore	New York	20,340	
L. Littlejohn & Co., Inc.	Singapore	New York	459,400	
Chas. T. Wilson Co., Inc.	Singapore	New York	695,260	
Hood Rubber Co.....	Singapore	Watertown	90,000	
Rubber Importers & Dealers Co., Inc.	Singapore	New York	104,400	
Rogers-Pyatt Shellac Co.	Singapore	New York	217,620	
H. A. Astlett & Co.....	Singapore	New York	81,820	
Various	Singapore	New York	374,920	
Balfour, Williamson & Co.	Penang	New York	332,820	
Various	Penang	New York	369,360	3,189,280
NOVEMBER 20. By the S. S. *Tosari*, at New York.				
L. Littlejohn & Co., Inc.	Java	New York	11,270	
Various	Soerabaya	New York	64,600	
Manhattan Rubber Mfg. Co.	Batavia	New York	31,500	
Fred Stern & Co.....	Batavia	New York	568,960	
Various	Batavia	New York	218,520	
Various	Tandj'g Priok	New York	24,480	
Various	Belawan-Deli	New York	458,960	1,378,290
NOVEMBER 20. By the S. S. *Kandahar*, at New York.				
Hood Rubber Co.....	Colombo	Watertown	90,720	
W. R. Grace & Co.....	Colombo	New York	9,720	
I. Aron & Co.....	Colombo	New York	12,960	
Whittall & Co. of Ceylon.	Colombo	New York	57,780	
Edward Maurer Co., Inc.	Colombo	New York	55,440	
Chas. T. Wilson Co., Inc.	Colombo	New York	80,640	
L. Littlejohn & Co., Inc.	Colombo	New York	26,100	
Thornett & Fehr, Inc....	Colombo	New York	57,600	
I. H. Rayner & Co.....	Colombo	New York	63,720	
Fred Stern & Co.....	Colombo	New York	11,200	
Various	Colombo	New York	454,440	920,320

CENTRALS

OCTOBER 25. By the S. S. *Quillota*, at New York.				
J. S. Sembrada & Co....	Guayaquil	New York	4,650	4,650
OCTOBER 25. By the S. S. *Grove*, at New York.				
Ultramares Corp.	Puerto Cabello	New York	3,750	
Various	Puerto Cabello	New York	955	4,705
OCTOBER 27. By the S. S. *Colon*, at New York.				
Various	Cristobal	New York	450	450
OCTOBER 28. By the S. S. *Sagua*, at New York.				
Various	Central American Ports	New York	1,650	1,650
NOVEMBER 5. By the S. S. *Ruby*, at New York.				
The Steiger Trading Co.	Matanzas	New York	1,200	
Harburger & Stack.....	Matanzas	New York	6,300	7,500
NOVEMBER 12. By the S. S. *Philadelphia*, at New York.				
Scholz & Co.....	Venezuelan Ports	New York	5,250	5,250
NOVEMBER 12. By the S. S. *Turrialba*, at New York.				
G. Amsinck & Co., Inc..	Cartagena	New York	1,800	1,800

JELUTONG

OCTOBER 29. By the S. S. City of *Oran*, at New York.				
Paterson, Simmons & Co.	Singapore	New York	20,700	
Various	Singapore	New York	352,800	373,500
NOVEMBER 8. By the S. S. *Migchow*, at New York.				
Various	Singapore	New York	117,000	117,000
NOVEMBER 20. By the S. S. *Tosari*, at New York.				
E. Everett Carlton & Co.	Soerabaya	New York	61,500	61,500

GUAYULE

	Shipment from:	Shipped to:	Pounds.	Totals.
OCTOBER 20. By rail at Eagle Pass, Texas.				
Continental-Mexican Rubber Co.	Mexico	New York	55,000	55,000
NOVEMBER 1. By rail at Eagle Pass, Texas.				
Continental-Mexican Rubber Co.	Mexico	New York	70,000	70,000
NOVEMBER 6. By rail at Eagle Pass, Texas.				
Continental-Mexican Rubber Co.	Mexico	New York	55,000	55,000

AFRICANS

NOVEMBER 1. By the S. S. *Rotterdam*, at New York.				
Various	Rotterdam	New York	88,205	88,205
NOVEMBER 8. By the S. S. *La Lorraine*, at New York.				
Various	Havre	New York	575	575
NOVEMBER 12. By the S. S. *Baltic*, at New York.				
Meyer & Brown, Inc....	Liverpool	New York	11,200	11,200
NOVEMBER 17. By the S. S. *Nieuw Amsterdam*, at New York.				
Various	Rotterdam	New York	1,495	1,495
NOVEMBER 19. By the S. S. *La Touraine*, at New York.				
American Hard Rubber Co.	Havre	New York	115	115
NOVEMBER 20. By the S. S. *Westerdyk*, at New York.				
Julius Schmid, Inc.....	Rotterdam	New York	115	115

GUTTA PERCHA

OCTOBER 29 By the S. S. *City of Oran*, at New York.				
Various	Singapore	New York	127,500	127,500
NOVEMBER 8. By the S. S. *Migchow*, at New York.				
L. Littlejohn & Co., Inc.	Port Said	New York	12,000	12,000
NOVEMBER 8. By the S. S. *Akron*, at New York.				
Various	Singapore	New York	72,600	72,600
NOVEMBER 4. By the S. S. *Djember*, at New York.				
The United Malaysian Rubber Co., Limited..	Borneo	New York	45,897	45,897
NOVEMBER 22. By the S. S. *Tosari*, at New York.				
The United Malaysian Rubber Co., Limited..	Borneo	New York	22,240	22,240

GUTTA SIAK

NOVEMBER 20. By the S. S. *Tosari*, at New York.				
Various	Belawan-Deli	New York	7,200	7,200

BALATA

OCTOBER 27. By the S. S. *Colon*, at New York.				
G. Amsinck & Co., Inc..	Cristobal	New York	3,105	3,105
OCTOBER 28. By the S. S. *Berenice*, at New York.				
Wm. Schall & Co.....	Dutch Guiana	New York	19,448	19,448
OCTOBER 29. By the S. S. *Achilles*, at New York.				
Wm. Schall & Co.....	West Indies	New York	3,450	3,450
NOVEMBER 5 By the S. S. *Mayara*, at New York.				
G. Amsinck & Co., Inc..	Port of Spain	New York	13,950	13,950
NOVEMBER 20. By the S. S. *Stavargaren*, at New York.				
G. Amsinck & Co., Inc..	Bolivar	New York	24,120	
Various	Bolivar	New York	12,600	36,720

ANTWERP RUBBER ARRIVALS

OCTOBER 29. By the S. S. *Albertville*, from the Congo.	
Société Anonyme Bungé (Cie. du Congo belge).....*kilos*	10,860
Société Anonyme Bungé (Grands Lacs).....	16,560
Crédit Colonial & Commercial—	
(Anc. L. & W. Van de Velde), (Comfina).....	29,493
(Anc. L. & W. Van de Velde).....	73,458
Société Coloniale Anversoise (Lomami).....	1,500
Various	61,565
Total .....*kilos*	193,436

Compiled by Grisar & Co., Antwerp.

CUSTOM HOUSE STATISTICS

PORT OF NEW ORLEANS

IMPORTS

MANUFACTURED—*free:*				
Crude rubber:				
From Nicaragua	6,500	$1,703	2,390	$423
Totals	6,500	$1,703	2,390	$423
Chicle	536	$315	3,893	$4,297

EXPORTS

MANUFACTURED:				
Automobile tires.....	.....	$1,299	.....	$309,875
Inner tubes	.....	.....	.....	47,256
Solid tires	.....	.....	.....	14,130
All other tires.....	.....	36	.....	805
Belting	.....	5,132	.....	12,130
Hose	.....	.....	.....	12,706
Packing	.....	.....	.....	2,487
Rubber boots.....*pairs*	321	1,002	.....	.....
Rubber shoes.....*pairs*	5,206	5,171	.....	43,530
Soles and heels.....	.....	.....	.....	22,146
Druggists' sundries.....	.....	1,146	.....	353
Other rubber manufactures..	.....	2,149	.....	12,407
Totals	5,527	$15,935	.....	$377,815
Insulated wire	.....	$2,334	.....	$14,019
Fountain pens.....*number*	120	127	.....	42
Suspenders	.....	.....	.....	27,003
Chewing gum.....	.....	4,331	.....	2,855

PORT OF NEW YORK

IMPORTS

	September 1919 Pounds	1919 Value	September 1920 Pounds	1920 Value
UNMANUFACTURED—*free:*				
Crude rubber:				
From Belgium	4,939	$1,770	.....	.....
France	46,086	31,576	.....	.....
Netherlands	.....	.....	307,383	$141,036
Canada	30,837	14,718	.....	.....
England	2,923,810	1,237,056	947,073	338,454
Guatemala	112	23	.....	.....
Nicaragua	14,751	4,210	1,584	432
Honduras	454	136	.....	.....
Panama	24,381	8,816	150	46
Argentina	32,746	16,806	3,010	1,241
Mexico	39,253	12,222	.....	.....
British West Indies	1,235	375	.....	.....
Bolivia	73,860	36,930	.....	.....
Brazil	8,147,297	2,495,311	1,509,440	410,832
Chile	357	72	.....	.....
Colombia	84,406	31,194	10,469	3,704
Uruguay	32,650	14,693	24,613	6,923
Ecuador	18,875	4,809	2,700	886
Peru	79,177	32,108	233,993	60,835
Venezuela	44,393	25,453	94,841	24,236
British India	11,200	5,304	67,200	25,290
British Guiana	4,002	3,491	.....	.....
Straits Settlements	6,206,256	2,437,947	11,956,859	4,584,403
British East Indies	2,854,147	1,062,419	2,218,726	725,342
Dutch East Indies	4,228,191	1,686,973	5,253,661	2,122,969
Hongkong	.....	.....	11,200	6,000
China	.....	.....	197,527	167,110
Japan	.....	.....	238,042	85,957
British West Africa	456,519	48,762	.....	.....
Philippine Islands	.....	.....	12,500	5,000
Australia	.....	.....	36,707	15,784
Belgian Congo	.....	.....	103,518	23,809
British E. Africa	.....	.....	3,174	696
Totals	25,359,934	$9,213,174	23,234,370	$8,750,985
Jelutong (Pontianak):				
From England	6,720	$1,431	.....	.....
Straits Settlements	1,192,809	135,327	397,559	$61,485
Dutch East Indies	.....	.....	68,921	10,670
Brazil	52,381	5,409	.....	.....
Totals	1,251,910	$142,167	466,480	$72,155
Gutta percha:				
From Straits Settlements	56,666	$14,160	248,867	$40,149
Dutch East Indies	.....	.....	59,522	11,058
Totals	56,666	$14,160	308,389	$51,207
Balata:				
From England	24,596	$24,061	743,579	$302,102
Guatemala	.....	.....	2,382	732
Colombia	19,157	9,545	26,127	11,030
Panama	14,793	5,600	.....	.....
Brazil	2,637	196	.....	.....
Venezuela	30,580	19,684	4,594	3,039
Straits Settlements	.....	.....	33,600	20,439
British East Indies	.....	.....	45,260	15,353
British Guiana	2,524	2,019	23,106	17,720
Dutch Guiana	86,048	60,785	15,467	9,728
Totals	180,335	$121,890	894,115	$380,143
Reclaimed and scrap rubber	382,477	30,161	497,303	25,266
Totals, unmanufactured	27,231,322	$9,521,552	25,400,657	$9,279,756
Manufactures of rubber and gutta percha	.....	$80,494	.....	$90,664
Rubber substitutes...*dutiable*	112	98	.....	.....
Chicle.....*dutiable*	345,317	215,759	241,994	162,007
Totals	345,429	$296,351	241,994	$252,671

EXPORTS

MANUFACTURED:				
Automobile tires	.....	$1,765,239	.....	$2,530,935
Inner tubes	.....	.....	.....	274,333
Solid tires	.....	.....	.....	170,665
All other tires	.....	106,177	.....	48,887
Belting	.....	324,703	.....	124,115
Hose	.....	.....	.....	162,831
Packing	.....	.....	.....	78,941
Rubber boots.....*pairs*	6,189	14,002	5,594	21,382
Rubber shoes.....*pairs*	558,707	518,681	540,388	530,834
Soles and heels	.....	.....	.....	34,503
Druggists' sundries	.....	69,551	.....	89,711
Other mfrs. of rubber	.....	295,555	.....	273,937
Totals, manufactured	564,896	$3,093,908	545,982	$4,341,074
Insulated wire	.....	$213,212	.....	$515,831
Fountain pens.....*number*	28,877	33,730	15,112	23,434
Suspenders and garters	.....	177,462	.....	326,066
Chewing gum	.....	.....	.....	159,865
Totals	28,877	$424,404	15,112	$1,025,196
UNMANUFACTURED—*free:*				
Reclaimed and scrap rubber	827,520	$99,617	219,941	$32,843

FOREIGN EXPORTS

Crude rubber	193,551	$84,709	803,250	$284,717
Balata	2,792	2,385	17,920	13,762
Rubber scrap	.....	.....	.....	425
Rubber manufactures	.....	4,557	.....	2,017

PORT OF BOSTON

IMPORTS

	September 1919 Pounds	1919 Value	September 1920 Pounds	1920 Value
UNMANUFACTURED—*free:*				
Crude rubber:				
From British India	.....	.....	12,640	2,600
Straits Settlements	.....	.....	14,000	5,649
British East Indies	.....	.....	140,120	36,433
Totals	.....	.....	166,760	$44,682
Rubber scrap and reclaimed	8,731	$295	21,274	$1,082
Rubber manufactures, *dutiable*	.....	5.734	.....	2,087

EXPORTS

MANUFACTURED:				
Automobile tires	.....	$1,765	.....	$1,413
Inner tubes	.....	.....	.....	618
Other tires	.....	.....	.....	50
Belting	.....	773	.....	4,257
Hose	.....	.....	.....	319
Packing	.....	.....	.....	350
Rubber boots.....*pairs*	11,745	31,810	11,331	33,164
Rubber shoes.....*pairs*	83,728	56,674	188,422	167,829
Soles and heels	.....	.....	.....	2,006
Druggists' sundries	.....	2,127	.....	4,178
Other rubber manufactures	.....	25,993	.....	35,243
Totals	95,473	$119,142	199,753	$249,427
Insulated wire	.....	$1,303	.....	$8,416
Fountain pens.....*number*	25	30	.....	.....
Suspenders and garters	.....	31,506	.....	10,379
Rubber scrap and reclaimed	57,775	6,081	.....	.....

PORT OF SEATTLE

IMPORTS

UNMANUFACTURED—*free:*				
Crude rubber:				
From Straits Settlements	1,376,810	$506,087	134,400	$39,071
British East Indies	18,000	6,773	.....	.....
Hongkong	217,490	76,122	.....	.....
Japan	.....	.....	380,800	122,528
Totals	1,612,300	$588,982	515,200	$161,599
Rubber manufactures	.....	$4	.....	$13,381

EXPORTS

MANUFACTURED:				
Automobile tires	.....	$9,767	.....	$122,414
Inner tubes	.....	.....	.....	4,166
Solid tires	.....	.....	.....	1,415
All other tires	.....	3,284	.....	5
Belting	.....	2,713	.....	8,544
Hose	.....	.....	.....	5,533
Packing	.....	.....	.....	67
Rubber boots.....*pairs*	1,490	4,980	552	2,123
Rubber shoes.....*pairs*	6,017	6,002	1,955	1,751
Druggists' sundries	.....	576	.....	399
Other rubber manufactures	.....	4,527	.....	3,947
Totals	7,507	$31,849	2,507	$150,364
Insulated wire	.....	699	.....	565
Fountain pens.....*number*	74	82	.....	.....
Suspenders	.....	532	.....	.....
Chewing gum	.....	210	.....	.....
Reclaimed rubber	176,246	7,056	.....	.....

PORT OF SAN FRANCISCO

IMPORTS

UNMANUFACTURED—*free:*				
Crude rubber:				
From Mexico	100	$10	.....	.....
British India	.....	.....	22,440	$5,838
Straits Settlements	3,303,142	1,453,968	56,462	18,329
Dutch East Indies	131,165	52,466	664,826	271,905
French East Indies	.....	.....	3,000	3,000
Hongkong	46,065	18,426	11,200	360
Japan	.....	.....	212,576	63,442
Totals	3,480,472	$1,524,870	970,504	$362,874
Jelutong (Pontianak)	23,789	$2,998	.....	.....
Rubber manufactures	.....	867	.....	$420
Chicle	.....	38,173	.....	.....

EXPORTS

MANUFACTURED:				
Automobile tires	.....	$58,666	.....	$265,647
Inner tubes	.....	.....	.....	15,317
Solid tires	.....	.....	.....	33,216
All other tires	.....	1,391	.....	11,417
Belting	.....	10,799	.....	70,851
Hose	.....	.....	.....	28,830
Packing	.....	.....	.....	26,188
Rubber boots.....*pairs*	15	65	1,013	3,993
Rubber shoes.....*pairs*	2,941	2,506	2,533	3,651
Soles and heels	.....	.....	.....	11,947
Druggists' sundries	.....	1,930	.....	4,776
Other rubber manufactures	.....	38,210	.....	37,914
Total	2,956	$113,567	3,546	$513,747
Insulated wire	.....	$29,302	.....	$9,621
Fountain pens.....*number*	735	1,971	222	418
Suspenders	.....	5,311	.....	7,582
Chewing gum	.....	3,416	.....	1,232
UNMANUFACTURED—*free:*				
Reclaimed and scrap rubber	22,184	$1,117	.....	.....

EXPORTS OF INDIA RUBBER MANUFACTURES AND INSULATED WIRE AND CABLE FROM THE UNITED STATES BY COUNTRIES, DURING THE MONTH OF SEPTEMBER, 1920

EXPORTED TO—	Belting	Hose	Packing	Boots		Shoes		Soles and	Automobile Tires				Insulated	Druggists'	All Other	
				Pairs	Value	Pairs	Value	Heels	Casings	Inner Tubes	Solid Tires	All Others	Wire and Cables	Rubber Sundries	Manufactures of Rubber	Totals
	Value	Value	Value					Value	Value	Value	Value	Value	Value	Value	Value	Value
EUROPE:																
Austria	.....	.....	.....	.....	.....	.....	.....	.....	$1,169	.....	.....	.....	.....	.....	.....	$1,169
Belgium	$1,000	$8,802	$21	.....	.....	2,836	$3,638	.....	56,780	$2,913	.....	$160	$5,218	.....	$1,573	80,105
Denmark	40	291	369	.....	.....	19,070	29,783	.....	63,386	3,009	.....	.....	2,227	.....	150	99,257
Finland	6,853	1,070	246	.....	.....	37,624	41,605	.....	5,577	512	$5,608	500	188	$67	.....	62,226
France	8,918	.....	6,330	.....	.....	23,398	22,921	.....	172,237	241	5,135	80	8,217	273	15,028	239,380
Germany	998	.....	63	.....	.....	.....	.....	.....	11,668	1,635	.....	6	143	.....	653	15,166
Greece	.....	.....	.....	.....	.....	.....	.....	.....	9,632	14,308	.....	97	.....	.....	46	24,083
Italy	14	.....	.....	.....	.....	14,412	17,250	.....	2,852	382	.....	.....	.....	295	217	21,010
Malta, Gozo and Cyprus Islands	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	83	87
Netherlands	4,018	14,826	1,693	.....	.....	.....	.....	.....	130,097	13,773	7,300	54	4,377	292	8,207	184,637
Norway	28	2,164	90	.....	.....	79,142	65,735	$1,705	68,478	5,825	3,595	.....	2,821	47	115	150,603
Poland and Danzig	.....	.....	.....	.....	.....	.....	.....	.....	29,640	6,159	.....	.....	.....	.....	.....	35,799
Portugal	.....	.....	.....	.....	.....	.....	.....	.....	8,861	64	.....	.....	200	.....	.....	9,125
Rumania	.....	.....	.....	.....	.....	.....	.....	.....	138	36	.....	.....	.....	.....	.....	174
Spain	2,000	286	.....	.....	.....	4,090	4,400	878	46,677	2,932	.....	.....	9,197	1,048	6,877	74,295
Sweden	3,035	4,483	387	1,108	$4,978	2,402	3,117	.....	327,185	22,822	205	8,518	14,172	835	6,240	395,977
Switzerland	7,038	177	77	376	1,026	71,713	55,295	2,049	24,606	2,472	.....	1,480	6,639	1,393	3,715	105,967
Turkey in Europe	.....	.....	.....	.....	.....	16,632	20,506	.....	2,866	241	.....	.....	.....	.....	.....	23,613
England	14,828	72,900	17,588	5,184	16,362	159,245	123,695	2,886	216,774	22,193	8,842	6,691	5,105	10,915	83,772	602,551
Scotland	.....	.....	.....	1,548	3,369	6,444	5,376	.....	4,893	600	.....	.....	.....	.....	.....	14,238
Yugoslavia, Albania, etc	.....	.....	.....	.....	.....	.....	.....	1,000	.....	.....	.....	.....	.....	.....	.....	1,000
TOTALS, EUROPE	$48,770	$104,999	$26,864	8,216	$25,735	437,008	$393,321	$8,518	$1,183,516	$100,117	$30,685	$17,586	$58,504	$15,169	$126,678	$2,140,462
NORTH AMERICA:																
Bermuda	.....	$230	$102	.....	.....	142	$216	$173	.....	.....	.....	.....	$154	$235	$329	$1,439
British Honduras	.....	45	.....	.....	.....	2,150	1,760	.....	$158	$56	.....	$53	.....	.....	51	2,123
Canada	$21,285	9,781	6,250	9,612	$37,588	13,734	17,018	172	105,360	16,053	$28,153	2,305	18,515	28,197	176,633	467,310
Costa Rica	350	288	.....	.....	.....	676	1,136	21	300	.....	.....	.....	1,308	365	243	4,011
Guatemala	3,210	43	.....	.....	.....	144	280	371	2,429	193	58	.....	46	38	455	7,123
Honduras	219	1,727	317	.....	.....	643	798	345	285	.....	.....	.....	666	60	112	4,529
Nicaragua	988	406	11	.....	.....	2,400	2,862	.....	1,496	158	124	.....	1,199	229	366	7,839
Panama	8,964	12,042	871	.....	.....	7,364	12,069	1,441	13,891	2,739	.....	.....	52,915	213	977	106,122
Salvador	29	58	.....	.....	.....	.....	.....	294	5,697	223	.....	.....	235	84	495	7,115
Mexico	33,163	74,814	30,332	97	495	19,132	21,775	3,589	118,947	26,463	3,160	6,169	46,284	11,269	28,494	404,954
Miquelon, Langley, etc	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	43	.....	.....	43
Newfoundland and Labrador	1,453	290	598	2,827	9,490	306	404	1,584	856	656	.....	55	935	107	1,915	18,343
Barbados	.....	.....	37	.....	.....	720	1,097	.....	.....	.....	52	131	.....	30	167	1,514
Jamaica	.....	56	158	.....	.....	24	40	930	8,550	365	52	.....	2,826	159	1,879	15,015
Trinidad and Tobago	34	1,077	749	.....	.....	5,608	6,659	589	5,357	1,074	515	3,785	559	50	791	21,239
Other British West Indies	34	62	.....	.....	.....	1,091	1,492	147	2,998	1,324	55	65	185	2	921	7,285
Cuba	2,975	35,097	20,567	8	57	193,825	189,574	14,452	382,007	55,561	24,465	9,722	107,503	24,686	29,538	896,204
Virgin Islands of U. S.	.....	.....	.....	.....	.....	1,097	1,822	.....	1,295	.....	.....	.....	.....	8	.....	3,125
Dutch West Indies	.....	.....	.....	.....	.....	2,727	3,377	10	1,223	24	63	.....	.....	10	6	4,713
French West Indies	.....	.....	.....	.....	.....	.....	.....	.....	1,691	167	800	.....	29	.....	4	2,691
Haiti	.....	398	.....	.....	.....	.....	.....	.....	2,639	2,050	326	.....	.....	29	51	5,493
Dominican Republic	.....	1,890	1,740	.....	.....	1,070	1,316	2,538	20,039	3,110	2,703	1,372	4,086	374	4,696	43,864
TOTALS, NORTH AMERICA	$72,704	$138,304	$61,732	12,544	$47,630	252,853	$263,695	$26,656	$675,218	$110,216	$60,526	$23,657	$237,488	$66,145	$248,123	$2,032,094
OCEANIA:																
Australia	$24,331	$13,319	$5,120	14	$64	19,806	$5,170	$304	$150,188	$7,965	$12,080	$8,453	$2,023	$3,026	$24,989	$257,032
New Zealand	8,129	3,884	3,179	363	1,737	2,912	3,359	114	216,883	9,088	41,872	5,031	14,816	472	13,404	321,968
Other British Oceania	.....	.....	.....	.....	.....	260	442	.....	2,747	345	.....	35	.....	.....	7	3,576
French Oceania	.....	226	159	.....	.....	1,261	2,108	35	2,573	376	.....	298	320	117	349	6,561
Other Oceania	.....	.....	.....	24	96	60	134	.....	197	70	190	.....	.....	.....	.....	687
Philippine Islands	15,228	8,527	3,245	.....	.....	92,621	105,675	11,623	235,678	35,745	27,807	956	37,691	1,968	23,786	507,929
TOTALS OCEANIA	$47,688	$25,956	$11,703	401	$1,897	116,920	$116,888	$12,076	$608,266	$53,589	$81,949	$14,773	$54,850	$5,583	$62,535	$1,097,753
SOUTH AMERICA:																
Argentina	$13,638	$7,536	$6,911	.....	.....	10,186	$10,248	$5,044	$428,582	$40,109	$4,158	$4,918	$63,176	$12,541	$54,117	$650,978
Bolivia	2,504	.....	.....	.....	.....	.....	.....	.....	90	.....	.....	.....	721	.....	64	3,379
Brazil	9,961	2,105	754	.....	.....	6,266	6,049	18,344	111,795	36,372	5,550	2,456	81,126	7,668	13,252	295,432
Chile	3,948	8,382	683	434	$2,130	648	619	153	8,561	919	562	2,548	2,277	1,062	35,183	67,027
Colombia	421	739	1,056	.....	.....	.....	.....	156	8,859	1,795	20	248	5,058	2,716	2,278	23,346
Ecuador	.....	32	.....	.....	.....	606	704	.....	255	44	.....	.....	428	686	1,057	3,206
British Guiana	.....	170	200	.....	.....	83	133	2	805	935	.....	.....	396	.....	49	2,690
Dutch Guiana	.....	.....	.....	.....	.....	24	23	.....	120	.....	.....	.....	.....	.....	153	296
Paraguay	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	72	.....	.....	72
Peru	8,579	5,948	339	264	2,199	42	50	46	10,351	1,998	2,639	.....	987	975	1,010	35,121
Uruguay	4,987	2,746	366	.....	.....	2,337	1,924	69	110,421	13,960	.....	638	7,341	7,412	8,436	158,300
Venezuela	982	98	1,055	.....	.....	.....	.....	431	20,757	3,189	54	160	2,252	4,277	3,946	37,201
TOTALS, SOUTH AMERICA	$45,020	$27,756	$11,364	698	$4,329	20,192	$19,750	$24,245	$700,596	$99,321	$12,983	$10,968	$163,834	$37,337	$119,545	$1,277,048

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Soles and Heels Value	Automobile Tires Casings Value	Automobile Tires Inner Tubes Value	Automobile Tires Solid Tires Value	Automobile Tires All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All Other Manufactures of Rubber Value	Totals Value
ASIA:																
Aden	......	......	......	......	......	......	......	......	......	$3,158	$349	......	......	......	......	$3,507
China	$28,724	$6,283	$5,650	5	$16	1,695	$1,841	$904	$28,145	2,232	146	$246	$75,135	$7,092	$24,365	180,779
Kwantung, leased territory	......	......	......	......	......	......	......	......	248	......	......	......	......	......	......	248
Chosen	......	61	......	......	......	552	597	......	......	663	......	......	......	......	......	1,321
British India	......	1,383	588	95	189	3,282	5,263	......	56,148	8,533	4,170	......	36,832	3,148	3,161	119,415
Straits Settlements	......	......	156	......	......	2,892	3,054	......	139,283	3,195	14,664	......	374	183	2,149	163,058
Dutch East Indies	3,617	5	......	......	......	......	......	......	137,035	5,575	64,100	1,498	4,524	936	2,011	219,301
French Indo China	......	......	......	......	......	......	......	......	......	......	......	......	53	......	95	148
Hongkong	......	......	671	......	......	3,081	3,370	......	905	......	......	......	610	339	2,128	8,023
Japan	7,920	5,539	16,198	4,518	12,322	7,041	7,462	31	36,369	4,527	1,600	4,249	2,998	359	19,986	119,560
Persia	......	......	......	......	......	......	......	......	912	1,461	......	......	......	......	......	2,373
Russia in Asia	......	......	......	12	98	......	......	......	......	......	......	......	......	......	22	120
Siam	......	......	36	......	......	......	......	......	......	......	290	......	......	46	......	372
Turkey in Asia	......	......	......	......	......	......	......	......	3,721	3,656	......	......	......	......	23	7,400
TOTALS, ASIA	$40,261	$13,271	$23,299	4,630	$12,625	18,543	$21,587	$935	$402,766	$33,000	$85,319	$5,993	$120,526	$12,103	$53,940	$825,625
AFRICA:																
British West Africa	......	......	......	......	......	269	$359	......	$56,702	$13,031	......	......	......	......	......	$70,092
British South Africa	$3,622	$6,574	$1,413	......	......	5,404	4,249	$4,503	237,139	39,673	$459	$5,620	$439	$1,063	$1,784	306,538
British East Africa	......	......	......	......	......	......	....	561	105	20	......	......	......	......	295	981
French Africa	......	......	......	......	......	......	......	......	9,386	......	......	......	......	......	27	9,413
Kamerun, etc.	......	......	......	......	......	......	......	......	329	50	......	......	......	......	......	379
Morocco	......	......	......	......	......	......	......	......	225	......	......	......	......	......	......	225
Portuguese Africa	......	2,585	......	......	......	......	......	......	......	......	......	......	......	......	40	2,625
Egypt	......	......	......	......	......	2	4	......	6,517	144	......	......	......	......	954	7,619
TOTALS, AFRICA	$3,622	$9,159	$1,413	......	......	5,675	$4,612	$5,064	$310,403	$52,918	$459	$5,620	$439	$1,063	$3,100	$397,872
TOTALS	$258,065	$319,445	$136,375	26,489	$92,216	851,191	$819,853	$77,494	$3,883,923	$446,352	$271,572	$78,597	$ 635,641	$137,400	$613,921	$7,770,854

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORY OF THE UNITED STATES

	Belting, Hose and Packing Value	Boots and Shoes Pairs	Boots and Shoes Value	Tires Automobile Value	Tires All Others Value	Insulated Wire and Cables Value	Druggists' Rubber Sundries Value	All other Manufactures of Rubber Value	Totals Value
Hawaii	$10,262	......	......	$88,807	$3,742	......	......	$12,992	$115,803
Porto Rico	7,400	......	......	75,107	2,358	......	......	31,251	116,116
TOTALS	$17,662	......	......	$163,914	$6,100	......	......	$44,243	$231,919

Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	August 1919 Pounds	August 1919 Value	August 1920 Pounds	August 1920 Value
UNMANUFACTURED—*free:*				
India rubber:				
From France	129,960	$32,268	....	....
Netherlands	....	....	122,932	$50,526
Portugal	....	....	69,237	25,859
United Kingdom	1,760,940	739,862	1,959,770	793,204
Canada	52,321	15,218	152	67
Central America	9,487	4,568	30,143	12,578
Mexico	5,466	1,576	145,523	29,927
Brazil	2,598,977	741,892	1,317,139	325,547
Peru	244,438	104,489	114,405	25,095
Other S. America	179,514	87,749	279,805	79,096
British E. Indies	17,108,838	6,918,405	34,649,711	16,480,846
Dutch E. Indies	44,850	16,893	4,226,814	1,801,010
Other countries	325,042	123,021	1,131,633	473,512
Totals	22,459,833	$8,785,941	44,047,264	$20,097,267
Balata	139,103	$93,142	41,222	$25,978
Guayule	....	....	234,953	44,113
Jelutong (Pontianak)	885,234	87,436	2,874,901	540,107
Gutta percha	316,575	65,798	1,410,791	369,448
Rubber scrap	649,421	54,026	1,281,110	105,638
Totals, unmanufactured	24,450,166	$9,086,343	49,890,241	$21,182,551
Chicle (dutiable)	377,187	$229,748	521,738	$354,374
MANUFACTURED—*dutiable:*				
India rubber and gutta percha	....	$46,284	....	$282,946
India rubber substitutes	130,816	7,142	....	....

EXPORTS OF DOMESTIC MERCHANDISE

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
MANUFACTURED—				
India rubber:				
Scrap and old	1,007,037	$90,118	282,655	$24,644
Reclaimed	334,413	50,675	429,603	74,652
Belting[1]	....		....	322,613
Hose[1]	....	518,310	....	251,807
Packing[1]	....		....	103,727
Boots[1] ....pairs	30,881	78,745	14,255	49,396
Shoes[1] ....pairs	640,921	459,142	488,638	481,460
Soles and heels[1]	....	....	....	65,964
Tires:				
For automobiles[1]	....		....	....
Casings[1]	....	2,350,901	....	3,121,530
Inner tubes[1]	....		....	327,009
Solid tires[1]	....		....	265,549
All other tires	....	110,736	....	59,931
Druggists' rubber sundries[1]	....	95,938	....	129,838
Suspenders and garters	....	245,663	....	291,852
Other rubber manufactures	....	789,177	....	600,955
Totals, manufactured	....	$4,789,405	....	$6,170,927
Fountain pens....*number*	27,334	$23,103	21,079	$25,907
Insulated wire and cables[1]	....	741,443	....	420,208

EXPORTS OF FOREIGN MERCHANDISE

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
UNMANUFACTURED—				
India rubber	254,263	$105,065	684,322	$241,238
Balata	5,900	2,065	99,778	50,640
Jelutong (Pontianak)	2,672	481	....	....
Rubber scrap	422	12	224,330	44,831
Totals, unmanufactured	....	$107,623	....	$336,709
MANUFACTURED—				
Gutta percha	....	$317	....	....
Totals, manufactured	....	$317	....	....
India rubber substitutes	305	$155	....	....
Chicle	....	....	309	$270

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES

	1919 Pounds	1919 Value	1920 Pounds	1920 Value
MANUFACTURED—				
To Alaska:				
Belting, hose and packing	....	$9,194	....	$6,030
Boots and shoes....*pairs*	8,921	22,045	10,531	37,904
Other rubber goods	....	5,621	....	8,522
Totals	....	$36,860	....	$52,456
To Hawaii:				
Belting, hose and packing	....	$8,284	....	$13,254
Automobile tires	....	80,186	....	167,451
Other tires	....	2,073	....	3,834
Other rubber goods	....	8,651	....	30,364
Totals	....	$99,194	....	$214,903
To Porto Rico:				
Belting, hose and packing	....	$4,819	....	$9,108
Automobile tires	....	87,704	....	158,253
Other tires	....	667	....	1,211
Other rubber goods	....	16,528	....	52,967
Totals	....	$109,718	....	$221,539

To Philippine Islands—treated as foreign commerce.

[1] Details of exports of domestic merchandise by countries during **August**, 1920, were given on pages 142-143 of THE INDIA RUBBER WORLD, November 1, 1920.

RUBBER STATISTICS FOR THE DOMINION OF CANADA

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	July 1919 Pounds	July 1919 Value	July 1920 Pounds	July 1920 Value
UNMANUFACTURED—*free:*				
Rubber, gutta percha, etc.:				
From United Kingdom	242,991	$108,856	519,666	$267,454
United States	579,034	226,144	233,669	70,665
British East Indies:				
India	.....	.....	5,000	1,776
Straits Settlements	1,195,633	520,046	256,487	102,502
Other countries	.....	.....	5,352	2,166
Totals	2,017,658	$855,046	1,020,174	$444,563
Balata	.....	.....	25	$46
Rubber recovered	492,265	$72,195	202,148	32,347
Rubber, powdered, and rubber or gutta percha scrap	24,305	856	67,868	3,336
Rubber substitutes	26,437	4,315	154,244	23,326
Totals, unmanufactured	2,560,665	$932,412	1,444,459	$503,618
PARTLY MANUFACTURED—				
Hard rubber sheets and rods	14,375	$5,547	39,866	$29,248
Hard rubber tubes	.....	1,995	.....	5,979
Rubber thread, not covered	3,253	4,553	14,089	17,315
Totals, partly manufactured	17,628	$12,095	53,955	$52,542
MANUFACTURED—				
Belting	.....	$18,739	.....	$13,038
Hose	.....	10,124	.....	11,288
Packing	.....	7,809	.....	7,511
Boots and shoes	.....	12,696	.....	10,020
Clothing, including waterproofed	.....	19,004	.....	21,525
Gloves	.....	1,313	.....	1,891
Hot water bottles	.....	1,395	.....	1,866
Tires, solid	.....	16,038	.....	15,968
Tires, pneumatic	.....	135,072	.....	67,612
Tires, inner tubes	.....	11,542	.....	10,832
Other manufactures	.....	184,072	.....	318,288
Totals, manufactured	.....	$417,904	.....	$479,839
Total, rubber imports	.....	$1,362,411	.....	$1,035,999
Insulated wire and cables:				
Wire and cables covered with cotton, linen, silk, rubber, etc.	.....	$13,163	.....	$24,847
Copper wire and cables, covered as above	.....	9,267	.....	16,492
Chicle	109,955	75,452	42,749	32,818

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS

	July 1919 Produce of Canada Value	July 1919 Reexports of Foreign Goods Value	July 1920 Produce of Canada Value	July 1920 Reexports of Foreign Goods Value
UNMANUFACTURED—				
Crude and waste rubber	$37,790	$191	$26,438	.....
MANUFACTURED—				
Belting	$2,085	.....	$3,982	.....
Hose	7,823	.....	25,559	.....
Boots and shoes	169,462	$222	116,214	.....
Clothing, including waterproofed	538	186	4,839	.....
Tires, pneumatic	655,696	8,824	906,498	$16
Tires, other kinds	11,109	.....	1,962	.....
Other manufactures	18,930	1,631	25,408	2,702
Totals, manufactured	$865,643	$10,863	$1,084,462	$2,718
Total rubber exports	$903,433	$11,054	$1,110,900	$2,718
Insulated wire and cable:				
Copper wires and cable	$117,203	.....	$25,876	.....
Chicle	73,484	.....	86	.....

UNITED KINGDOM RUBBER STATISTICS.

IMPORTS

	August 1919 Pounds	August 1919 Value	August 1920 Pounds	August 1920 Value
UNMANUFACTURED—				
Crude rubber:				
From—				
Straits Settlements	4,595,700	£460,442	5,962,200	£587,976
Federated Malay States	2,779,800	260,110	5,926,000	588,726
British India	716,200	69,045	725,400	70,884
Ceylon and dependencies	1,054,300	104,060	5,691,800	546,559
Other Dutch possessions in Indian seas	886,500	85,566	671,900	67,352
Dutch East Indies (except other Dutch possessions in Indian seas)	270,400	25,727	3,089,900	309,586
Other countries in the East Indies and Pacific not elsewhere specified	225,100	21,534	209,100	20,890
Brazil	677,300	73,257	1,567,700	131,413
Peru	70,200	6,973	.....	.....
South and Central America (except Brazil and Peru)	113,200	10,650	.....	.....
West Africa:				
French West Africa	.....	.....	9,000	862
Gold Coast	12,200	1,174	5,300	586
Other parts of West Africa	20,400	2,094	56,800	4,549
East Africa (including Madagascar)	34,500	2,890	110,000	9,460
Other countries	16,300	1,576	313,600	27,630
Totals	11,472,100	£1,125,098	24,338,700	£2,366,473
Waste and reclaimed rubber	253,200	6,989	605,000	6,646
Totals, unmanufactured	11,725,300	£1,132,087	24,943,700	£2,373,119
Gutta percha and balata	1,109,600	£174,005	714,700	£169,419
Rubber substitutes	.....	.....	232,900	13,787
MANUFACTURED—				
Boots and shoes...*dozen pairs*	32,904	£52,474	15,824	£49,519
Waterproof clothing	.....	1,392	.....	1,202
Tires and tubes	.....	257,682	.....	570,293
Other rubber manufactures	.....	51,489	.....	93,171
Insulated wire	.....	901	.....	8,814

EXPORTS

UNMANUFACTURED—				
Waste and reclaimed rubber	1,086,800	£24,074	901,900	£25,829
*Rubber substitutes	.....	.....	76,500	3,870
Totals	1,086,800	£24,074	978,400	£29,699
MANUFACTURED—				
Boots and shoes...*dozen pairs*	16,608	£34,442	7,830	£16,047
Waterproof clothing	.....	213,245	.....	236,554
Insulated wire	.....	102,511	.....	148,077
Submarine cables	.....	73,983	.....	70,393
Tires and tubes	.....	478,228	.....	601,537
Other rubber manufactures	.....	272,410	.....	394,113
Totals	16,608	£1,174,819	7,830	£1,466,721

EXPORTS—COLONIAL AND FOREIGN

UNMANUFACTURED—				
Crude rubber:				
To Russia	.....	.....	7,200	£775
Sweden, Norway and Denmark	430,300	£41,712	29,300	3,005
Germany	941,900	98,766	850,300	80,765
Belgium	2,506,500	189,465	226,400	23,742
France	2,070,900	195,419	2,389,100	237,926
Spain	91,100	10,681	36,000	4,568
Italy	1,511,800	164,033	697,000	65,157
Austria-Hungary	80,700	8,270	2,200	195
Other European countries	1,953,200	184,715	145,000	13,047
United States	771,700	65,227	2,804,000	328,298
Canada	540,700	49,018	268,700	26,835
Other countries	69,600	8,724	347,900	39,374
Totals, rubber	10,968,400	£1,016,030	7,803,100	£823,687
Waste and reclaimed rubber	45,000	2,022	31,400	953
Gutta percha and balata	101,400	16,592	135,900	23,495
*Rubber substitutes	.....	.....	21,400	830

* Included in "Other Articles," Class III, T, prior to 1920.

UNITED STATES CRUDE RUBBER IMPORTS FOR 1920 (BY MONTHS)

1920	Plantations	Parás	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Balata	Miscellaneous Gum	Waste	Totals 1920	Totals 1919
January ...*tons*	17,799	2,620	821	111	....	....	....	....	....	21,351	7,235
February	29,681	2,456	558	265	34	....	....	....	....	32,994	17,456
March	28,533	2,463	514	23	114	3	113	983	1,252	33,998	28,223
April	21,036	1,893	628	29	79	10	22	812	448	24,957	28,146
May	24,443	2,025	662	95	113	....	45	1,059	224	28,666	16,348
June	12,911	1,352	427	27	164	....	7	552	164	15,604	16,319
July	14,695	1,115	34	40	....	....	8	1,283	312	17,487	17,965
August	12,730	590	13	75	156	....	67	1,135	300	15,066	11,067
September	10,974	459	99	8	74	22	44	516	218	12,414	14,036
October	8,759	1,613	27	17	223	....	33	498	425	11,595	28,888
Totals, 10 months, 1920	181,561	16,586	3,783	690	957	35	339	6,838	3,343	214,132	.....
Totals, 10 months, 1919	137,336	22,650	2,544	1,244	1,478	431	....	....	....	....	185,683

Compiled by The Rubber Association of America, Inc.

	August 1919 Pounds	August 1919 Value	August 1920 Pounds	August 1920 Value
MANUFACTURED—				
Boots and shoes...*dozen pairs*	643	£1,462	576	£1,424
Waterproof clothing	.....	5	.....	316
Tires and tubes	.....	8,414	.....	98,822
Insulated wire	.....	42	.....	41
Other manufactures	.....	5,239	.....	4,432
Totals, manufactured	643	£15,162	576	£105,035

*Included in "Other Articles," Class III, T., prior to 1920.

UNITED KINGDOM RUBBER STATISTICS

IMPORTS

	September 1919 Pounds	September 1919 Value	September 1920 Pounds	September 1920 Value
UNMANUFACTURED—				
Crude rubber:				
From—				
Straits Settlements	5,893,800	£597,163	7,537,400	£703,073
Federated Malay States	2,055,000	204,081	4,659,400	460,194
British India	297,000	30,349	582,800	54,089
Ceylon and dependencies	1,551,100	150,133	4,095,200	383,202
Other Dutch possessions in Indian Seas	211,200	22,561	590,400	58,974
Dutch East Indies (except other Dutch possessions in Indian seas)	2,050,400	206,682	649,400	53,665
Other countries in the East Indies and Pacific not elsewhere specified	40,900	4,090	142,300	13,978
Brazil	1,479,900	159,426	801,200	63,322
Peru	158,700	15,452	8,900	896
South and Central America (except Brazil and Peru)	1,700	170	12,400	1,174
West Africa:				
French West Africa	6,700	560	300	25
Gold Coast	7,200	717	11,900	995
Other parts of West Africa	62,300	5,563	18,200	1,877
East Africa (including Madagascar)	70,300	5,947	122,000	9,819
Other countries	98,200	9,668	1,105,700	91,674
Totals	13,984,400	£1,412,562	20,337,500	£1,896,957
Waste and reclaimed rubber	391,700	10,054	497,200	7,779
Totals, unmanufactured	14,376,100	£1,422,616	20,834,700	£1,904,736
Gutta percha and balata	669,400	£116,084	900,800	£179,755
*Rubber substitutes	.....	.....	8,700	658
MANUFACTURED—				
Boots and shoes...*dozen pairs*	31,260	£58,744	5,112	£14,975
Waterproof clothing	.....	37	.....	484
Insulated wire	.....	70	.....	3,342
Tires and tubes	.....	280,328	.....	581,946
Other rubber manufactures	.....	44,982	.....	45,737

EXPORTS

UNMANUFACTURED—				
Waste and reclaimed rubber	1,086,200	£22,510	1,808,900	£51,479
*Rubber substitutes	.....	.....	166,000	8,188
Totals	1,086,200	£22,510	1,974,900	£59,667
MANUFACTURED—				
Boots and shoes...*dozen pairs*	5,813	£13,146	8,336	£22,478
Waterproof clothing	.....	151,527	.....	306,793
Insulated wire	.....	74,207	.....	164,837
Submarine cables	.....	24,380	.....	72,992
Tires and tubes	.....	420,079	.....	514,486
Other rubber manufactures	.....	215,595	.....	389,704

EXPORTS—COLONIAL AND FOREIGN

UNMANUFACTURED—				
Crude rubber:				
To Russia	.....	.....	23,400	£3,200
Sweden, Norway and Denmark	1,272,900	£122,664	440,100	37,979
Germany	1,660,500	156,400	736,600	59,981
Belgium	757,300	64,251	147,700	14,591
France	1,069,200	115,077	1,323,400	126,727
Spain	27,600	3,026	46,400	4,202
Italy	133,300	13,517	129,600	11,218
Austria-Hungary	66,900	7,098	6,700	650
Other European countries	1,676,800	159,249	272,800	24,055
United States	2,917,800	283,005	274,100	26,589
Canada	1,192,200	106,141	683,200	68,810
Other countries	.....	.....	184,600	19,482
Totals, rubber	10,774,500	£1,030,428	4,268,600	£397,484
Waste and reclaimed rubber	.....	.....	.....	£830
Gutta percha and balata	129,200	£15,713	48,400	5,881

	September 1919 Pounds	September 1919 Value	September 1920 Pounds	September 1920 Value
UNMANUFACTURED—*free:*				
Crude rubber:				
MANUFACTURED—				
Boots and shoes...*dozen pairs*	2	£10	1,185	£4,218
Waterproof clothing	.....	113	.....	20
Tires and tubes	.....	1,508	.....	16,197
Insulated wire	.....	.....	.....	1,142
Other manufactures	.....	2,813	.....	2,101
Totals manufactured	.....	£4,444	.....	£23,678

*Included in "Other Articles," Class III, T., prior to 1920.

RUBBER STATISTICS FOR ITALY

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Three Months Ended March 1919 Quintals[1]	1919 Lire[2]	1920 Quintals	1920 Lire
UNMANUFACTURED—				
Crude rubber and gutta percha—raw and reclaimed:				
From Great Britain	97		28	
French Colonies in Asia	97		1,475	
British India and Ceylon	17,365		1,486	
Straits Settlements	8,770	38,074,050	1,162	7,023,450
French African Colonies	1,007		381	
Belgian Congo	.....		245	
Brazil	8,789		1,777	
Other countries	136		135	
Totals	36,261	38,074,050	6,689	7,023,450
Rubber scrap	.....	.....	111	19,980
Totals, unmanufactured	36,261	38,074,050	6,800	7,043,430
MANUFACTURED—				
India rubber and gutta percha—				
Threads	90	234,000	98	254,800
Sheets, including hard rubber	81	130,500	23	37,700
Tubes	29	36,000	21	29,700
Belting	81	113,400	249	348,600
Rubber-coated fabrics in pieces	79	126,200	119	185,100
Boots and shoes...*pairs*	6,772	101,580	31,381	470,715
Elastic webbing	86	240,800	83	232,400
Clothing and articles for travel	.....	.....	57	182,400
Tires and tubes:				
From France	1,471		845	
Great Britain	2	3,537,600	1,206	6,446,400
Other countries	1		635	
Other rubber goods	4,335	6,641,000	3,801	5,025,500
Totals, manufactured	.....	11,161,080	.....	13,213,315
Total imports	.....	49,235,130	.....	20,256,745

EXPORTS OF CRUDE AND MANUFACTURED RUBBER

	Three Months Ended March 1919 Quintals[1]	1919 Lire[2]	1920 Quintals	1920 Lire
UNMANUFACTURED—				
India rubber and gutta percha—raw and reclaimed:				
To Austria	.....		300	
Spain	1,632		284	
United States	234	746,400	671	520,000
Other countries	.....		45	
Totals	1,866	746,400	1,300	520,000
Waste	.....	.....	1,409	169,080
Totals, unmanufactured	1,866	746,400	2,709	689,080
MANUFACTURED—				
India rubber and gutta percha—				
Threads	84	226,800	119	321,300
Sheets, including hard rubber	35	72,000	81	119,100
Tubes	193	225,400	422	482,300
Belting	94	150,400	.....	.....
Rubber-coated fabrics in pieces	21	25,200	59	71,600
Boots and shoes...*pairs*	.....	.....	446	10,175
Elastic webbing	220	660,000	359	1,077,000
Clothing and articles for travel	.....	.....	94	451,200
Tires and tubes:				
To Austria	.....		333	
Belgium	633		225	
Czecho-Slovakia	.....		373	
France	80		337	
Great Britain	704		3,006	
Spain	2		104	
Switzerland	1	5,272,500	131	19,036,100
British India and Ceylon	100		1,056	
Dutch East Indies	.....		673	
Straits Settlements	130		391	
Australia	241		231	
Argentina	274		654	
Brazil	291		687	
Other countries	319		1,818	
Other rubber goods	472	698,600	2,377	3,481,400
Totals, manufactured	.....	7,330,900	.....	25,050,175
Total exports	.....	8,077,300	.....	25,739,255

[1]One quintal equals 220.46 pounds.
[2]One lira equals $0.193 (normal).

RUBBER STATISTICS FOR ITALY

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	Four Months Ended April			
	1919		1920	
	Quintals[1]	Lire[2]	Quintals	Lire
UNMANUFACTURED—				
Crude rubber and gutta percha—				
raw and reclaimed:				
From Great Britain	.....		146	
India and Ceylon	17,856		2,672	
Straits Settlements	12,219		2,562	
French African Colonies	1,007	45,854,550	565	11,745,300
Belgian Congo	94		466	
Brazil	11,580		2,803	
Other countries	915		1,972	
Totals	43,671	45,854,550	11,186	11,745,300
Rubber scrap	12	2,160	111	19,980
Totals, unmanufactured	43,683	45,856,710	11,297	11,765,280
MANUFACTURED—				
India rubber and gutta percha—				
Threads	123	319,800	98	254,800
Sheets, including hard rubber	84	136,200	43	67,900
Tubes	51	64,600	41	77,800
Belting	84	117,600	251	351,400
Rubber coated fabrics....*pieces*	117	186,300	181	279,900
Boots and shoes.....*pairs*	9,526	142,890	37,164	557,460
Elastic webbing	88	246,400	104	291,200
Clothing and articles for travel	.....	.....	75	240,000
Tires and tubes—				
From France	1,859		1,140	
Great Britain	269	5,107,200	1,841	9,571,200
Other countries	.....		1,007	
Other manufactures	7,167	10,968,400	4,971	7,831,800
Totals, manufactured	.....	17,289,390	.....	19,523,460
Total imports	.....	63,146,100	.....	31,288,740

EXPORTS OF CRUDE AND MANUFACTURED RUBBER

UNMANUFACTURED—				
India rubber and gutta percha—				
raw and reclaimed:				
To Austria	.....		300	
Spain	1,726	1,046,400	468	913,600
United States	890		1,339	
Other countries	.....		177	
Totals	2,616	1,046,400	2,284	913,600
Rubber scrap	.....	.....	2,884	346,080
Totals, unmanufactured	2,616	1,046,400	5,168	1,259,680
MANUFACTURED—				
India rubber and gutta percha—				
Threads	126	340,200	147	396,900
Sheets, including hard rubber	52	112,800	110	174,600
Tubes	249	305,100	556	633,700
Belting	94	150,400	.....	.....
Rubber coated fabrics....*pieces*	42	50,400	89	110,000
Boots and shoes.....*pairs*	.....	.....	445	6,675
Other footwear	.....	.....	1	3,500
Elastic webbing	272	816,000	478	1,434,000
Clothing and articles for travel	.....	4,800	156	748,800
Tires and tubes:				
To Austria	50		377	
Belgium	655		277	
Czecho-Slovakia	.....		428	
France	83		643	
Great Britain	1,493		3,622	
Spain	2		134	
Switzerland	4		138	
India and Ceylon	100	7,087,000	1,945	26,155,400
Dutch East Indies	.....		791	
Straits Settlements	130		716	
Australia	.....		231	
Argentina	274		1,222	
Brazil	303		954	
Other countries	636		2,288	
Other rubber goods	575	867,800	3,569	5,208,400
Totals, manufactured	.....	9,734,500	.....	34,871,975
Total exports	.....	10,780,900	.....	36,131,655

[1]One quintal equals 220.46 pounds.
[2]One lira equals $0.193 (normal).

THE MARKET FOR RUBBER SCRAP

NEW YORK

THE rubber scrap business has been described as virtually suspended. Reclaimed rubber plants when not shut down completely are not averaging to produce over 10 per cent of their normal capacity. Under these circumstances, reclaimers are not interested to purchase scrap of any grade, even at present prices, which are so low that they scarcely permit the collectors to continue operations. The following quotations are nominal:

QUOTATIONS FOR CARLOAD LOTS DELIVERED

Prices subject to change without notice

NOVEMBER 24, 1920

BOOTS AND SHOES:			
Arctic tops	*lb*	*$0.075 @	
Boots and shoes	*lb*	*.05½ @	.05¾
Trimmed arctics	*lb.*	*.05¼ @	.05¾
Untrimmed arctics	*lb.*	*.04¼ @	.04¾
HARD RUBBER:			
Battery jars, black compound	*lb*	*.01 @	.01¼
No. 1, bright fracture	*lb.*	*.23 @	.24
INNER TUBES:			
No. 1	*lb.*	*.11½ @	.12
Compounded	*lb.*	*.06 @	.07
Red	*lb.*	*.05½ @	.06
MECHANICALS:			
Black scrap, mixed, No. 1	*lb*	*.03½ @	.04
No. 2	*lb.*	*.02½ @	.02¾
Car springs	*lb.*	*.03½ @	.04
Heels	*lb.*	*.03 @	.03½
Horse-shoe pads	*lb.*	*.03 @	.03½
Hose, air brake	*lb.*	*.03½ @	.03¾
fire, cotton lined	*lb*	*.01½ @	.01¾
garden	*lb.*	*.01½ @	.01¾
Insulated wire stripping, free from fiber	*lb.*	*.03½ @	.04
Matting	*lb.*	*.01¼ @	.01½
Red packing	*lb.*	*.05½ @	.06
Red scrap, No. 1	*lb.*	*.09 @	.10
No. 2	*lb.*	*.06¾ @	.07¼
White scrap, No. 2	*lb.*	*.08 @	.09
No. 1	*lb*	*.10 @	.11
TIRES:			
PNEUMATIC—			
Auto peelings	*lb.*	*.03¼ @	.04¼
Bicycle	*lb.*	*.02¼ @	.02¾
Standard white auto	*lb.*	*.03 @	.03½
Mixed auto	*lb*	*.01¾ @	.02¼
Stripped, unguaranteed	*lb.*	*01 @	.02½
White, G. & G., M. & W., and U. S.	*lb.*	*.03½ @	.04
SOLID—			
Carriage	*lb.*	*.03 @	.03¼
Irony	*lb.*	@	
Truck	*lb.*	*.02½ @	.02¾

*Nominal.

THE MARKET FOR COTTON AND OTHER FABRICS

NEW YORK

THE unprecedented decline in the consumption of American cotton and the accumulation of finished goods in the hands of manufacturers is the fundamental reason for the present market weakness. Middlings uplands spot cotton was quoted at 22.50 cents on November 1, and with minor fluctuations steadily declined, when, on November 24 this grade of cotton was quoted at 17.30 cents. Considering the generally unsatisfactory conditions surrounding this market it is unsafe to predict that the low level for the present year has been reached.

ARIZONA PIMA COTTON is apparently not in urgent need of marketing at present, owing possibly to the fact that some of the large tire companies made contracts with farmers in the Salt River Valley and are taking cotton against these contracts at 60 cents and better. It is believed, however, that a firm offer of 50 cents would buy extra Pima. It is very probable that the crop will not be as large as anticipated, and it will be surprising if the crop reaches 75,000 bales, although the weather has been ideal and a good top crop will, of course, increase the yield.

EGYPTIAN COTTON appears to have declined more than other staples, and good grade uppers can be bought today for 25 and 27 cents, although this growth has stiffened in value since last week. Sakel cotton, however, continues to decline and prices

range from 35 to 45 cents, according to grade. The last estimate of the Alexandria General Produce Association forecasts a crop of 6,175,000 cantars, which is considerably below earlier figures.

SEA ISLAND COTTON is quoted nominally at 70 cents for average extra choice, although there is little doubt but that a firm bid considerably below this figure would be accepted. The ginnings thus far are very small, and as the cotton is closely held it will probably be the last of the staples to meet the demand for lower prices. Carolina Island cotton is just coming in but the so-called "crop lots" are few and far between.

DUCKS, DRILLS AND OSNABURGS. The market has been stagnant during the past month and the only business done was by second hands. Frices have been marked down in the entire list.

RAINCOAT FABRICS. Despite very substantial price reductions in this market, business has been quiet and very little goods have been sold.

TIRE FABRICS. Technically the market for tire fabrics does not exist, as there are no quotations representing a trading basis. Only distressed lots of fabric are being sold at prices that are not representative of values. The fabric mills will be practically out of the market until normal trading is resumed. The prices quoted in the following list are those ruling August 1, 1920:

NEW YORK QUOTATIONS

NOVEMBER 24, 1920

Prices subject to change without notice

ASBESTOS CLOTH:			
Brake lining, 2½ lbs. sq. yd., brass or copper insertion	*lb.*		@
2¼ lbs. sq. yd., brass or copper insertion	*lb.*		@
BURLAPS:			
32—7-ounce	*100 yards*	$5.50	@
32—8-ounce		5.50	@
40—7½-ounce			@
40—8-ounce		6.00	@
40—10-ounce		7.50	@
40—10½-ounce		7.75	@
45—7½-ounce		8.00	@
45—8-ounce		8.25	@
48—10-ounce		10.00	@
DRILLS:			
38-inch 2.00-yard	*yard*	.22½	@ .23½
40-inch 2.47-yard		.18¾	@ .19
52-inch 1.90-yard		.23¼	@ .24¾
52-inch 1.95-yard		.23	@ .24½
60-inch 1.52-yard		.29½	@ .30⅞
DUCK:			
CARRIAGE CLOTH:			
38-inch 2.00 yard enameling duck	*yard*	.23½	@
48-inch 1.74-yard		.27	@
72-inch 16.66-ounce		.63¼	@
72-inch 17.21-ounce		.66⅝	@
MECHANICAL:			
Hose	*pound*	.43	@
Belting		.43	@
HOLLANDS, 40-INCH:			
Acme	*yard*	*.27¼	@
Endurance		*.26¼	@
Penn		*.26⅞	@
OSNABURGS:			
40-inch 2.35-yard	*yard*		@
40-inch 2.48-yard			@
37½-inch 2.42-yard			@
RAINCOAT FABRICS:			
COTTON:			
Bombazine 64 x 60	*yard*	.13½	@
60 x 48		.12½	@
Cashmeres, cotton and wool, 36-inch, tan		.85	@
Twills 64 x 72		.20	@
64 x 102		.23	@ .24
Twill, mercerized, 36-inch, blue and black		.35	@
tan and olive		.32½	@
Tweed		.40	@ 1.00
printed		.22½	@
Plaids 60 x 48		.13½	@
56 x 44		.13	@
Repp		.30	@ .35
Prints 60 x 48		.14	@
64 x 60		.15	@
IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES:			
63-inch, 3¼ to 7½ ounces	*yard*	$0.81	@ $2.22
36-inch, 2¾ to 5 ounces		.63	@ 1.62
IMPORTED PLAID LINING (UNION AND COTTON):			
63-inch, 2 to 4 ounces	*yard*	.71	@ 1.57
36-inch, 2 to 4 ounces		.44	@ .84
SHEETINGS, 40-INCH:			
48 x 48, 2.35-yard	*yard*	*.19½	@
48 x 48, 2.50-yard		*.18½	@
48 x 48, 2.85-yard		*.15	@
64 x 68, 3.15-yard		*.18¼	@
56 x 60, 3.60-yard		*.14¼	@
48 x 44, 3.75-yard		*.14	@
SILKS:			
Canton, 38-inch	*yard*	.40	@
Schappe, 36-inch		.50	@
STOCKINETTES:			
SINGLE THREAD:			
3½ Peeler, carded	*pound*		@
4½ Peeler, carded		.75	@
6½ Peeler, combed		1.00	@
DOUBLE THREAD:			
Zero Peeler, carded	*pound*	.56	@
3½ Peeler, carded			@
6½ Peeler, combed			@
TIRE FABRICS:			
BUILDING:			
17¼-ounce Sakellarides, combed	*pound*	*2.35	@
17¼-ounce Egyptian, combed		*2.15	@
17¼-ounce Egyptian, carded		*2.05	@
17¼-ounce Peelers, combed		*2.25	@
17¼-ounce Peelers, carded		*1.47	@

CORD:			
15-ounce Egyptian	*pound*	*$2.40	@
BICYCLE:			
8-ounce American	*pound*	*1.50	@
10-ounce American		*1.48	@
CHAFER:			
9¼-ounce Sea Island	*pound*		@
9¼-ounce Egyptian, carded		*2.29	@
9¼-ounce Peeler, carded		*1.71	@

*Nominal.

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS

NEW YORK

THE ABSENCE of indications of an early resumption of production by the tire manufacturing companies and of a marked demand for rubber goods in other important lines continues to effectively curtail demand for zinc oxide, lithopone, carbon black and other commonly used compounding ingredients. Surplus stocks held by second hands have been absorbed.

Prices in general are considered as being now at bed-rock and a decided reaction and firmer tone is predicted with the first evidence of buying activity.

All calcined magnesia refined in the East comes from mines in California. With one exception, these have been closed down owing to the fact that they have been losing money due to the advance in mining costs. They also require large expenditures of money for repairs and development work.

Future expansion of the domestic magnesia business is said to depend largely on more favorable tariff conditions

ANILINE OIL. Stocks are ample. Spot price early in the month was 26 cents per pound, declining to 25 cents toward the close.

BARYTES. The demand has been steady, but less urgent, affording the producers to get better control of the situation as regard filling old orders.

BENZOL. Prices have remained firm at 36 to 38 cents per gallon for 90 per cent test and two cents higher for the chemically pure grade.

BLACKS. Curtailment of tire production has markedly reduced the demand for carbon black.

CARBON BISULPHIDE. Supplies have been moderate and the price firm at 8 to 9 cents per pound.

CARBON TETRACHLORIDE. The market is described as inactive with prices declining. Spot 13½ cents.

DRY COLORS. Market featured by general inactivity.

LITHARGE. Prices have fallen with a decline in the lead market.

LITHOPONE. The demand has been mostly confined to the paint trade. Tire makers are not in the market at present.

SUBLIMED LEAD. This lead product has declined in sympathy with the lowering in price of pig lead.

SULPHUR. Prices are firm and demand moderate.

WHITING. Stocks of chalk whiting are low, due to shortage of chalk importations. Rubber makers, however, are dependent more on by-product whiting than on chalk whiting and consequently are not inconvenienced.

ZINC OXIDE. Falling off in demand due to the greatly reduced demands from the automobile tire industry has caused a slump in the production of zinc oxide.

NEW YORK QUOTATIONS

November 24, 1920

Prices subject to change without notice

ACCELERATORS, ORGANIC			
Accelerene (New York)	*lb.*	$4.75	@
Accelemal	*lb.*	.60	@ .65
Aldehyde ammonia crystals	*lb.*	1.75	@ 1.85
Aniline oil	*lb.*	.25½	@ .30
Excellerex	*lb.*	.70	@
Hexamethylene tetramine (powdered)	*lb.*	1.60	@ 1.70
N. C. C.	*lb.*	*.50	@
No. 999	*lb.*	$0.17½	@
Paraphenylenediamine	*lb.*	*2.60	@ 2.70
Thiocarbanilide	*lb.*	.55	@ .60
Velosan	*lb.*	*3.70	@
Vul-Ko-Cene	*lb.*	.35	@
Virol	*lb.*	.80	@
ACCELERATORS, INORGANIC			
Lead, dry red (bbls.)	*lb.*	.11	@ .11¼
sublimed blue (bbls.)	*lb.*	.09¼	@
sublimed white (bbls.)	*lb.*	.09¼	@
white, basic carbonate (bbls.)	*lb.*	.09¼	@ .09½
Lime, flour	*lb.*	.03	@
Litharge, domestic	*lb.*	.11¼	@
imported	*lb.*	.17	@
sublimed	*lb.*	.12	@
Magnesium, carbonate, light	*lb.*	.10½	@ .15
calcined extra light	*lb.*	.60	@
calcined light	*lb.*	.30	@ .60
calcined medium light	*lb.*	.25	@
calcined heavy	*lb.*	.07	@ .09
calcined commercial (magnesite)	*lb.*	.05	@
oxide, extra light	*lb.*	.60	@
light technical	*lb.*	.35	@
light, imported	*lb.*	.55	@
imported	*lb.*	.55	@
ACIDS			
Acetic, 28 per cent	*lb.*	.10½	@
glacial, 99 per cent	*lb.*	.22¼	@
Aqua fortis	*cwt.*	7.40	@
Cresylic (97% straw color) (bbl.)	*gal.*	1.20	@ 1.30
(95% dark) (bbl.)	*gal.*	1.10	@ 1.20
Muriatic, 20 degrees	*lb.*	.06	@
Nitric, 36 degrees	*cwt.*	7.28	@
Sulphuric, 66 degrees	*lb.*	.03½	@
ALKALIES			
Caustic soda, 76 per cent (bbls.)	*lb.*	.05½	@
Soda ash (bbls.)	*lb.*	.05	@
COLORS			
Black:			
Bone, powdered	*lb.*	.06	@
granulated	*lb.*	.11	@ .15
Carbon black (sacks, factory)	*lb.*	.12	@ .20
pressed	*lb.*	.18	@
Dipped goods	*lb.*	1.50	@
Drop	*lb.*	.07½	@ .18
Ivory black	*lb.*	.18	@ .30
Lampblack	*lb.*	.18	@ .45
Oil soluble aniline	*lb.*	1.00	@
Rubber black	*lb.*	.08½	@
Rubber makers' black	*lb.*	.20	@ .30
Blue:			
Cobalt	*lb.*	.30	@ .35
Dipped goods	*lb.*	1.50	@
Prussian	*lb.*	.90	@
Ultramarine	*lb.*	.18	@ .40
Rubber makers' blue	*lb.*	3.50	@
Brown:			
Iron oxide	*lb.*	.04½	@ .06½
Sienna, Italian, raw and burnt	*lb.*	.06½	@ .15
Umber, Turkey, raw and burnt	*lb.*	.05½	@ .09½
Vandyke	*lb.*	.06	@ .08
Maroon oxide	*lb.*	.14	@ .15
Green:			
Chrome, light	*lb.*	.42	@ .70
medium	*lb.*	.42	@ .70
dark	*lb.*	.50	@ .70
commercial	*lb.*	.07	@ .15
tile	*lb.*	.15	@ .20
Dipped goods	*lb.*	1.50	@
Oxide I. R.	*lb.*	.85	@
Oxide of chromium (casks)	*lb.*	1.25	@
Rubber makers' green	*lb.*	3.50	@
Red:			
Antimony, crimson, sulphuret of (casks)	*lb.*	.45	@ .49
crimson, "Mephisto" (casks)	*lb.*	.60	@
crimson, "R. M. P."	*lb.*	.58	@
Antimony, golden sulphuret of (casks)	*lb.*	.29	@ .30
golden, "Mephisto" (casks)	*lb.*	.35	@
golden, "R. M. P."	*lb.*	.30	@
vermilion sulphuret	*lb.*	.60	@
red sulphuret	*lb.*	.25	@ .27
Arsenic, red sulphide	*lb.*	.14	@ .15
Dipped goods, red	*lb.*	1.75	@
purple	*lb*	1.75	@
Indian	*lb.*	.14	@ .15
Para toner	*lb.*	2.00	@
Red excelsior	*lb.*	*.19	@ .22
Toluidine toner	*lb.*	4.25	@

Iron oxide, reduced grades	lb.	$0.05½	@	$0.12
pure bright	lb.	.15	@	.17
Spanish neutral	lb.	.05½	@	.06
Venetian	lb.	.03	@	.09
Oil soluble aniline, red	lb.	2.00	@	
orange	lb.	1.65	@	
Oximony	lb.	.18	@	
Vermilion, American	lb.	.25	@	.30
permanent	lb.	.37	@	
English quicksilver	lb.	1.45	@	1.55
Rubber makers' red	lb.	3.50	@	4.00
purple	lb.	2.50	@	
White:				
Albalith	lb.	.07¼	@	.08¼
Aluminum bronze, extra brilliant	lb.	.65	@	
extra fine	lb.	.75	@	
Lithopone, Beckton white	lb.	.08½	@	.08¾
Lithopone	lb.	.07¾	@	.08¼
Ponolith (carloads, factory)	lb.		@	
Rubber-makers' white	lb.		@	
Zinc oxide. American (factory):		C. L.		L. C. L.
Special	lb.	.10	@	.10½
XX red	lb.	.09½	@	.10¼
French process (factory):				
White seal	lb.	.13	@	.13¼
Green seal	lb.	.11¾	@	.12¼
Red seal	lb.	.10¾	@	.13
White seal, imported	lb.	1.17	@	
Azo factory:				
ZZZ (lead free)	lb.	.09½	@	.10
ZZ (under 5% leaded)	lb.	.08½	@	.09
Z (8-10% leaded)	lb.	.35	@	
Yellow:				
Cadmium, sulphide, yellow, light, orange	lb.	2.10	@	
red	lb.	2.10	@	
Chrome, light and medium	lb.	.35	@	
Dipped goods	lb.	1.75	@	
Ochre, domestic	lb.	.02½	@	.05½
imported	lb.	.04¼	@	.08
Rubber makers'	lb.	3.50	@	
Zinc chromate	lb.	.50	@	
Oil soluble aniline	lb.	1.75	@	

COMPOUNDING INGREDIENTS

Aluminum flake (carload)	ton	45.00	@	
hydrate	lb.	.25	@	
silicate	ton	28.00	@	40.00
Ammonium carbonate (powdered)	lb.	.17¼	@	
Asbestine (carloads)	ton	30.00	@	40.00
Barium, carbonate, precipitated	ton	100.00	@	
dust	ton	110.00	@	
Barytes, pure white (f. o. b. works)	ton	40.00	@	
off color	ton	30.00	@	
uniform floated	ton	28.00	@	
German "Cream"	ton	50.00	@	
Basofor	lb.	.06	@	
Blanc fixe (dry, bbls.)	lb.	.06	@	.06¼
Bone ash	lb.	.12	@	
Carrara filler	lb.	.02	@	
Chalk, precipitated, extra light	lb.	.05	@	.05½
heavy	lb.	.04	@	.04½
China clay, Dixie	ton	22.00	@	
Blue Ridge	ton	22.00	@	
domestic	ton	10.00	@	20.00
imported	ton	40.00	@	
Cotton linters, clean mill run, f. o. b. factory	lb.	.02	@	.03
Fossil flour (powdered)	ton	60.00	@	
(bolted)	ton	65.00	@	
Diatomite	lb.	.03	@	
Glue, high grade	lb.	.35	@	.45
medium	lb.	.30	@	.35
low grade	lb.	.20	@	.25
Graphite, flake (400-pound bbl.)	lb.	.10	@	.25
amorphous	lb.	.04	@	.08
Ground glass FF. (bbls.)	lb.	.05	@	
Infusorial earth (powdered)	ton	60.00	@	
(bolted)	ton	65.00	@	
Liquid rubber	lb.	.18	@	
Mica, powdered	lb.	.15	@	
Pumice stone, powdered (bbl.)	lb.	.04	@	.06
Rotten stone, powdered	lb.	.02½	@	.04½
Rubber paste	lb.	*.19	@	.22
Silica, gold bond	ton	32.50	@	
silver bond	ton	22.50	@	
Soap bark	lb.	.24	@	
Soapstone, powdered gray (carload)	ton	12.00	@	
Starch, powdered corn	cwt.	3.18	@	
Talc, powdered soapstone	ton	18.00	@	25.00
Terra blanche	ton	24.00	@	32.00
Tripoli earth, air-floated, cream or rose (factory)	ton	50.00	@	
white (factory)	ton	52.50	@	
Tyre-lith	ton	110.00	@	
Whiting, Alba (carloads)	cwt.	.80	@	.90
Columbia	cwt.	.95	@	
commercial	ton	30.00	@	
Danish	ton	22.00	@	
English cliffstone	ton	42.50	@	
gilders	ton	40.00	@	
Paris, white, American	ton	27.00	@	
Quaker	ton	13.00	@	15.00
Super	ton	30.00	@	32.50
Wood pulp, imported	lb.	.03¾	@	
XXX	ton	60.00	@	
X	ton	60.00	@	
Wood flour, American	ton	50.00	@	

MINERAL RUBBER

Elateron (c. l. factory)	ton	55.00	@	
(l. c. l. factory)	ton	58.00	@	
Gilsonite	ton	75.00	@	
Genasco (c. l. factory)	ton	69.00	@	
(l. c. l. factory)	ton	71.00	@	
Hard hydrocarbon	ton	$42.00	@	
Soft hydrocarbon	ton	40.00	@	
K-X	ton		@	
K. M. R.	ton		@	
M. R. X.	ton		@	
Pioneer (c. l. factory)	ton	60.00	@	
(l. c. l. factory)	ton	65.00	@	
Raven M. R.	ton	60.00	@	65.00
Refined Elaterite	ton		@	
Richmond (car load)	ton	75.00	@	
No. 64 (car load)	ton	45.00	@	
318/320 M. P. hydrocarbon (c. l. factory)	ton	60.00	@	
(l. c. l. factory)	ton	62.50	@	
300/310 M. P. hydrocarbon (c. l. factory)	ton	45.00	@	
(l. c. l. factory)	ton	47.50	@	
Robertson, M. R. pulverized (c. l. factory)	ton	95.00	@	
M. R. pulverized (l. c. l. factory)	ton	97.50	@	
M. R. (c. l. factory)	ton	72.50	@	
M. R. (l. c. l. factory)	ton	75.00	@	
Rubrax (factory)	ton	50.00	@	
Synpro, granulated	ton	97.50	@	
Walpole rubber flux (factory)	lb.		@	

OILS

Avoilas compound	lb.		@	
Castor, No. 1, U. S. P.	lb.	.15	@	.17
No. 3, U. S. P.	lb.	.14	@	
Corn	lb.	.13	@	.17¼
Corn, refined Argo	cwt.	*17.25	@	
Cotton	lb.	.11	@	
Glycerine (98 per cent)	lb.	.29	@	
Linseed, raw (carloads)	gal.	1.00	@	
Linseed compound	gal.		@	
Palmoline	lb.	.14	@	.16
Palm niger	lb.	.11	@	
Palm "Lagos"	lb.	.11½	@	
Palm special	lb.	.17	@	
Peanut	lb.	.14	@	
Petrolatum	lb.	.08	@	.11
Petrolatum, sticky	lb.	.10	@	.14
Petroleum grease	lb.	.07½	@	.09
Pine, steam distilled	gal.	1.50	@	1.65
Rapeseed, refined	lb.	.19	@	
blown	lb.	.20	@	
Rosin	gal.	.50	@	.75
Synpro	gal.	.59	@	.90
Soya bean	lb.	.11½	@	
Tar	gal.	.37	@	.41

RESINS AND PITCHES

Balsam, fir	gal.	2.00	@	
Cantella gum	lb.	.50	@	
Cumar resin, hard	lb.	.12	@	.16
soft	lb.	.09	@	.13
Tar, retort	bbl.	15.50	@	15.75
kiln	bbl.	15.00	@	15.75
Pitch, Burgundy	lb.	.07	@	
coal tar	lb.	.01½	@	
pine tar	lb.	.04	@	
ponto	lb.	.14	@	
Rosin, K	bbl.	11.90	@	
strained	bbl.	*12.90	@	
Shellac, fine orange	lb.	1.05	@	

SOLVENTS

Acetone (98.99 per cent drums)	lb.	.20	@	
methyl (drums)	gal.	*1.50	@	
Benzol (water white, 90%)	gal.	.36	@	.38
Beta-naphthol	lb.	.47	@	.48
Carbon bisulphide (drums)	lb.	.08½	@	.09½
tetrachloride (drums)	lb.	.13	@	.14
Naphtha, motor gasoline (steel bbls.)	gal.	.31	@	
73 @ 76 degrees (steel bbls.)	gal.	.41	@	
70@ 72 (steel bbls.)	gal.	.39	@	
68 @ 70 degrees (steel bbls.)	gal.	.38	@	
V. M. & P. (steel bbls.)	gal.	.30	@	
solvent	gal.	.30	@	
Toluol, pure	gal.	.35	@	.40½
Turpentine, spirits	gal.	1.03	@	
wood	gal.	.98	@	
Osmaco reducer	gal.	*.65	@	
Xylol, pure	gal.	.45	@	.50½
commercial	gal.	.30	@	.35½

SUBSTITUTES

Black	lb.	.10	@	.18½
White	lb.	.11	@	.21½
Brown	lb.	.14	@	.20½
Brown factice	lb.	.08¾	@	.18
White factice	lb.	.10	@	.20
Paragol, soft and medium (carloads)	cwt.	15.81	@	
hard	cwt.	15.81	@	

VULCANIZING INGREDIENTS

Lead, black hyposulphite (Black Hypo)	lb.		@	
Orange mineral, domestic	lb.	.15¼	@	
Sulphur chloride (jugs)	lb.	.20	@	
(drums)	lb.	.08	@	
Sulphur, flour, Brooklyn brand (carloads)	cwt.	2.90	@	3.15
Bergenport, soft (c. l. factory)	cwt.	3.15	@	
Bergenport, soft (l. c. l. factory)	cwt.	3.45	@	
superfine (carloads, factory)	cwt.		@	

(See also Colors—Antimony.)

WAXES

Wax, beeswax, white	lb.	.52	@	.54
ceresin, white	lb.	.16	@	
carnauba	lb.	.23	@	.38
ozokerite, black	lb.	.45	@	.50
green	lb.	*.65	@	
Montan	lb.	*.20	@	
paraffine, 115° m. p.	lb.	.12½	@	
120° m. p.	lb.	.12¼	@	
125° m. p.	lb.	.13½	@	
130° m. p.	lb.	.14½	@	
Sweet wax	lb.	.15	@	

* Nominal.

INDIA RUBBER WORLD
FOUNDED 1880
CAOUTCHOUC GUTTA-PERCHA

Vol. 63 DECEMBER 1, 1920 No. 3

TABLE OF CONTENTS.